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Improved and Simplified Band Saw.

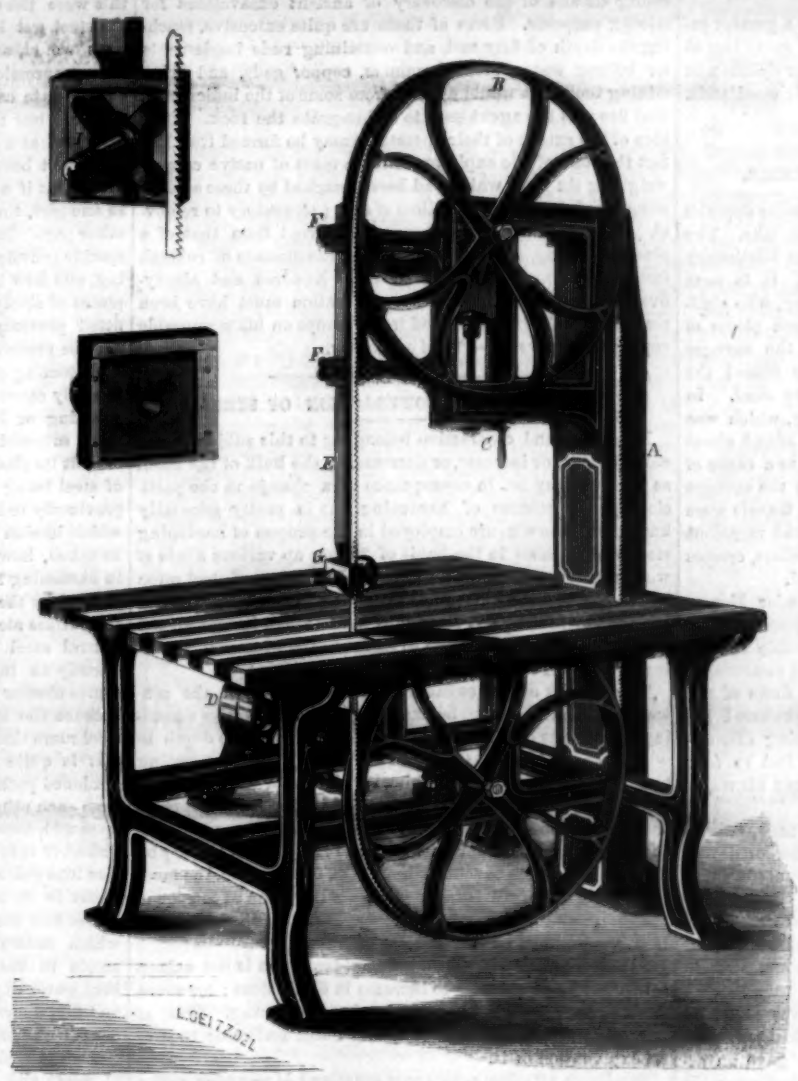
The endless or Band Saw has not heretofore received that degree of attention from our mechanics to which its merits entitle it. In England it is extensively used for wood work, and lately has been successfully employed on iron, especially for locomotive work. Visitors to the late fair of the American Institute must have observed the operation of the machine of which we give herewith illustrations, one being a perspective view of the machine complete, and the others of the saw guide.

With the exception of the table top, the machine is entirely of iron, the frame being strong while it is light. The standard, A, supports a frame, on which is an upwright sliding block and arm sustaining a horizontal shaft running in boxes. On this shaft is hung the upper wheel, B, which by means of the screw and hand wheel, C, can be elevated or lowered as the length of the saw demands. The lower portion of the frame under the table supports the lower shaft and wheel, which is driven by the pulleys, D. The two wheels have a flange against which the back of the saw bears, and the faces of the wheels are covered with vulcanized rubber resting on a bedding of strong cloth. This gives sufficient adhesion to the saw to insure its action as a belt without slipping.

From the front of the upper frame depends a vertical bar, E, sliding in boxes, to which it may be secured, at any hight required to accommodate the stuff to be sawed, by the thumb nuts, F. On the lower end of the bar is a guide, G, having four sides with recesses of varying depth to accommodate the various width of different saws. This guide is in two parts, held together by a screw bolt and graduated in the distance of their faces by means of the screw bolt and a four-pronged spring. The construction of the guide is better seen at H and I, the latter of which shows a section of the saw lying in one of the recesses. This guide can be turned quarter or half-way round to bring either of the different widths of recesses to engage with the saw.

The great advantage of the band saw over the reciprocating saw is, that there is no lost time in its operation, and no effort required to keep the work to the table, as the action of the saw tends to this result. Beside, there is no need of a pump or blower to clear away the saw dust, as it is carried continually downward. It was patented through the Scientific American Patent Agency, Aug. 28, 1866. Messrs. First & Pryibil, the patentees and manufacturers, state that the saw travels at the rate of 4,000 feet per minute, and by actual experiment, will do four times the amount of work performed with an ordinary up and down saw. Its work is very smooth, requiring less after labor in finishing. Certainly it is a simple and economical machine, as is evident from its construction and operation. The manufacturers join the ends of the saw by silver solder, used in connection with a clamp made specially for the purpose, and the original temper of the plate is perfectly preserved.

All communications relative to the machine should be addressed to First & Pryibil, 175 and 177 Hester street, corner Mott, New York city.

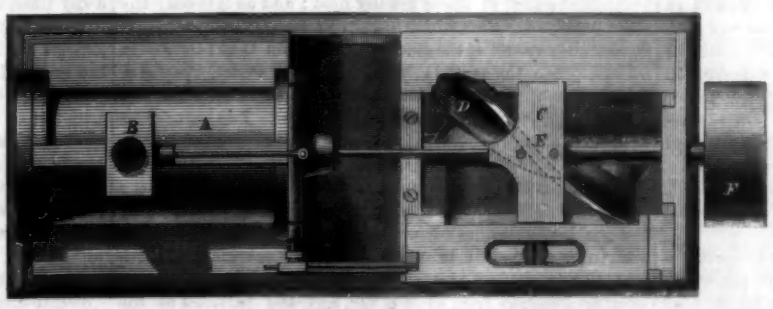


FIRST & PRYIBIL'S PATENT BAND SAW.

Plan for Converting Reciprocating into Rotary Motion.

There have been quite a number of ingenious devices contrived to take the place of the crank, and avoid what are popularly supposed to be the defects in this method of converting motion. Whether this supposition is correct or not, it is probable that these attempts will be repeated indefinitely. That shown in the annexed engraving is one of the simplest, and the inventor says it has answered all his expectations. He has two engines of the same dimensions, taking steam from the same boiler, one, the ordinary crank engine, and the other running with the spiral cam, the latter giving by far the best results.

The engraving presents a top view of the engine, A being the cylinder, B the steam chest, C the crosshead, and D the spiral cam. From the lower surface of the crosshead project two pins, seen at E, which engage with the sides of the cam flanges and impart a rotary motion to the shaft on which the cam is mounted, and through the pulley, F, to machinery. The model or pattern of the cam may be formed by turning a block of wood of the length of stroke required and of the same diameter. On both heads parallel lines are struck, and the ends of these lines connected by two other lines on the circumference, which, when the diameter of the block is, say, ten inches, will be ten inches apart and parallel to each other. Then with a pair of dividers, opened somewhat less than half the diameter of the block, arcs are described from the opposite ends of the side lines. Then by opening the dividers to the full half diameter of the block and describing two other arcs, the thickness of the wings or flanges of the cam is determined. After repeating this operation on the opposite end of the block, the material is removed to the center of the block, leaving the parts between the arcs intact, and the cam is formed. The inventor says: "The flanged cam takes the place of the crank, and it has the great advantage that the power is applied always at the same distance from the center of the shaft, and under the most favorable circumstances, so that no dead center exists and a continuous revolving motion will be imparted to the shaft without requiring a fly wheel. It can be applied in all cases where a reciprocating rectilinear motion is to be converted into a rotary motion, and is used with great success on reaping machines in place of the crank. The cam is so constructed at its ends that when the outside pin in the crosshead passes the extreme outer end of the cam, the inside pin, being at this moment the propelling power, does not pass the dead point until the outside pin has passed, when that becomes the propelling power until it reaches the opposite end of the cam."



HURLBUT'S SPIRAL CAM ENGINE.

Patented through the Scientific American Patent Agency March 26, 1867, by William H. Hurlbut, who may be addressed relative to the invention at Mirabile, Caldwell Co., Mo.

Preserve the Forests.

As compared with Europe, or with our own prairie States, New England and New York are regions of forest. There is scarcely any part of these States where the forest does not make a prominent feature of the landscape, and in most parts it predominates. Of course we do not mean the unbroken, primeval forest, but that succession of woodlands and tree-crowned hills which reveal to the traveler at at once, as he comes from other countries, that he has reached a land where nature is still wild, and fuel cheap. But around the cities and along the seashore already wood begins to be scarce, and attention must be given to the planting of trees. Accordingly, in Barnstable, Nantucket, and Bristol counties, Mass., something has been done in this novel species of husbandry, as it would have seemed to our grandfathers. There can be no doubt that forests have a great influence on the moisture and fertility of the soil. It is traditional that whole regions in Spain which are now barren or only used for pasturage a part of the season, were, before the noble woods of the country were cut down, free from drouth and rich in crops. In France, the same tendency has been checked by legislation, which interfered, as early as 1669, to prevent the felling of forests without permission. The legislation is now very stringent, and in addition the Government exercises the right of compulsory plantation of trees on the land of citizens who will not be hired by the public money to plant for themselves.

The French law of 1859 forbids the cutting down of any wood larger than twenty-five acres, unless it shall appear to the proper authorities that such wood is not necessary to protect the soil on mountains or steep slopes, or against the encroachments of rivers; or to preserve springs and water courses from drying up, and the seashore from being blown or washed away; for the defence of the frontier or for the public health. It was found that to cut off the forests caused the hillsides to be stripped of soil, and the springs to dry up; that torrents and freshets were much more injurious afterwards, and that the sea sand encroaches upon the arable fields as soon as the woods near the shore disappeared. Every one who has paid much attention to the subject knows that these changes take place, giving rise sometimes to remarkable phenomena. For instance, the long beach at Plymouth, when the Pilgrims landed there, was covered with trees, and an island of considerable extent outside of the beach was also wooded. Since the trees have been cut the sea has washed the island away so that it is covered by every tide, and the beach has become so narrow in some parts that the heavy seas break through it, and needs to be strongly protected by artificial means. As the security of the harbor of Plymouth depends upon this beach, the folly of cutting down the trees is now manifest.

The effect of the laws against cutting, and in favor of planting trees, in France, has been such, that of late years, instead of a steady decrease in the extent of woodland in the Empire, there has been a constant gain. In 1860 the wooded surface of France was 8,783,343 hectares, or less than 22,500,000 acres, the whole number of acres of land in France being at least 135,000,000. In 1865 the number of hectares in wood had increased to over 9,000,000, or nearly a million acres more than fifteen years. In a few of the other European countries preservation of wood has been undertaked, but nowhere with so much success as in France. Until within a few years, since coal has commanded a high price, the natural increase of wood in Massachusetts has kept pace with the amount cut off in each year.

But there is reason to believe that for the last year or two it has not been so, and in this part of the State especially,

there has been a great cutting down of firewood, the timber there having been used up some time ago.

It is true that planting has also been going on, but not on a large scale—not enough to prevent those changes in soil and climate which certainly follow the destruction of standing forests. It would be well, therefore, for our farmers and the owners of estates to consider whether they ought not to take some greater pains to plant and preserve the growth of wood, which for fuel, for protection to the soil, and for ornament, will become of more and more value each year.

The countries in Europe, which most nearly resemble our own in respect to forests are Russia, in which there are 450,000,000 acres of woodland out of a total of 1,000,000,000 acres; and the Scandinavian peninsula, where it is said three fourths of the country is covered with wood. Canada and the extensive possessions of England to the north of Canada are counterparts in this hemisphere of Norway, Sweden, and northern Russia, and will be more and more drawn upon as our population increases and the woods recede. They are now of much value to Great Britain in this respect, for the English and Irish forests have almost entirely gone, and but few remain in Scotland.

England has thus far found in her coal mines a greater resource than anciently in her forests, but it is a great loss to her to have parted with those entirely. Let her children in America profit by her example and preserve their woodlands. —*Springfield Republican.*

THE COPPER REGION OF LAKE SUPERIOR.

Attention was very early called to the remarkable deposits of native copper upon the shores of this great lake. The first mention of it appears to have been in the Missionary Reports of the Society of Jesus, for 1659–60. It is next spoken of by Claude Allouez, a Jesuit missionary, who visited this region in 1666. He speaks of having seen pieces of copper of ten or twenty pounds weight, which the savages reverenced as household gods, and of having passed the site of a great rock of copper, then buried in sand. In 1670 Father Dablon reports a marvellous story, which was told him by the Indians, concerning a copper island about fifty leagues from the Saut, which he interprets as a cause of poisoning from the metal, loose pieces of which the savages used in cooking their meat. Charlevoix, whose travels were published in 1744, corroborates these accounts, and mentions the fact that a brother of the order made chandeliers, crosses and censers of the copper which was there found.

About 1763, a practical Englishman, Alexander Henry, passed through this region. He narrowly escaped being massacred by the Indians, but in spite of his trouble he kept his eyes open to his own interest. In 1771, he commenced mining operations in the clay bluffs, near the forks of the Ontonagon river. The following year he transferred his workmen to the vein on the north shore, but being discouraged by the contraction of the lode from four feet to four inches, he became disgusted, and finally abandoned his workings.

In 1819, General Cass and Mr. H. R. Schoolcraft, passed through this region, and visited the famous mass of native copper on the Ontanagon. In 1823, Major Long and his party saw the scattered boulders of this formation. Nothing, however, came of all these observations, the general impression being that the wildness of the country and its distance from settlements rendered these enormous natural resources valueless, at least for many years.

The first impulse to mining in this district was given by Dr. Douglass Houghton, State geologist of Michigan, who, in 1841, in his annual report to the legislature, gave an account of the geology of the country, and the first scientific description of the copper deposits. Subsequently, he devised an admirable plan for developing the resources of this region, and had commenced carrying it into practice when his sudden death by drowning put a stop to these important observations.

In 1843 was ratified with the Chippewas a treaty, which put the United States in possession of the territory as far west as the Montreal river, and southerly to the boundary of Wisconsin. The same year numbers of persons entered land in this neighborhood, by the provisions of a joint resolution of Congress in reference to the "lead lands" of Illinois, passed as far back as 1818. At first the applicant was allowed to select a tract three miles square, but afterward he was limited to one mile square. He was required to make selection within a year, to mark the corners, to leave a person in charge to point out the bounds, and to transmit to the proper department a description and plat of the same. On the receipt of this plat, the applicant was entitled to a lease of three years, renewable for three additional years, on condition that he should work the mines with due diligence and skill, and pay the Federal Government six per cent. of all the ores raised.

As a natural consequence of these liberal provisions, a great influx of speculators and their agents took place into this territory. The first mining operations were commenced in 1844. Masses of native copper, containing silver, were found, and numerous veins were discovered. About a thousand permits were granted by the department, and nine hundred and sixty-one sites selected. Sixty leases for tracts three miles square, and one hundred and seventeen for tracts one mile square were granted, and mining companies were organized under them. Most of the tracts covered by these were taken at random, and without any explorations whatever; indeed, a large portion of them were on rocks which do not contain any metalliferous veins at all, or in which the veins, when they do occur, are not found to be productive. The excitement reached its hight in 1846. Quantities of stock were sold which represented no value whatever, and this reckless speculation injured the reputation of the mines.

In 1847 the country was almost deserted, only about half a dozen companies, out of all that had been formed, being engaged in mining.

In 1846, further grants of land were suspended as illegal, the resolution in regard to *lead* not covering *copper* lands, and the following year Congress passed an act authorizing the sale of the lands and a geological survey. For the latter purpose, Dr. Charles T. Jackson was appointed, but after having spent two seasons in these explorations, he resigned, whereupon the work was confided to Messrs. Foster & Whitney, who have given a very full and satisfactory account of the geology of the country and its prospects as a mining region. Meanwhile, the actual miners had made considerable progress in their excavations, and as they purchased lands after thorough examination, confidence was gradually restored. By the time the United States Survey had been completed, and its results published, in 1850, copper mining had become an established business.

The report of Foster & Whitney contains some very interesting details of the discovery of ancient excavations for mining purposes. Some of these are quite extensive, reaching the depth of fifty feet, and containing rude implements for boiling water, stone hammers, copper gads, and other mining tools. It would appear, from some of the indications, that fire was the agent used to disintegrate the rock. Some idea of the extent of their operations may be formed from the fact that one of the explorers found a mass of native copper weighing six tuns, which had been detached by these ancient miners and supported on billets of oak, preparatory to removal. The age of these works may be inferred from that of a pine-tree stump, growing out of one of the mounds of rubbish from the mine. This contained three hundred and ninety-five annual rings, so that the exploration must have been made before Columbus started from Europe on his memorable voyage of discovery.—*Piggot on Copper.*

EXPANSION AND CONTRACTION OF STEEL.

Expansion and contraction belonging to this subject is the enlargement, or increase, or decrease, in the bulk of the steel, as the case may be, in consequence of a change in the particles by the process of hardening. It is pretty generally known to those who are employed in the process of hardening steel, and to those in the habit of fitting up various kinds of work requiring great nicety, that the hardening of steel often increases its dimensions; so that such pieces of work, fitted with nicety in their soft state, will not fit when hardened, and the workman has therefore to resort to the process of grinding or lapping to make the work fit.

The amount of the expansion (or the amount of the contraction) of steel cannot be exactly stated, as it varies according to the size of the steel operated upon, and the depth to which the steel hardens; also in the different kinds according to the amount of carbon combined, and even in the same steel operated upon at different degrees of heat. Steel which is the most liable to injury by excess of heat is the most liable to these expansions, and steel which is less liable to injury by heat is most liable to contractions. As, for example, the more carbon the steel contains, the greater will be the expansion of the steel; and the nearer the steel approaches to the state of iron, the less will be this increase of bulk.

Although the steel expands in hardening, it is not universal for pieces of all sizes to increase in dimensions; for sometimes it is smaller in dimensions after hardening. This, at first sight, appears anomalous; but I will endeavor to give an explanation of it.

Steel, like all other substances composed of particles, varies in its dimensions with a change in temperature. It follows that when the steel is at a red heat, the natural positions of its particles are in a measure displaced, and it is expanded to a greater bulk; and when immersed in water and suddenly cooled, such a change of its particles takes place as to make it hard and brittle. It also contracts to a smaller bulk by the loss of heat; but this cannot so rapidly occur at the central part, because it is protected by the surface steel. Consequently, large pieces of steel do not harden all through; or, in other words, do not harden properly to their centers, but toward the center the parts are gradually less hard, and will sometimes admit of being readily filed; and as it is only the outer parts of the steel which harden properly, consequently it is only those parts of the steel which harden that increase in bulk. When the steel is immersed in the water, the water begins first of all to act upon the outer crust of the steel, and then cooling it gradually toward the center. The outer crust being the first to part with its heat, it is of course the first to contract and become smaller. The outer crust in contracting is held in a state of great tension, by having to compress the central steel (the central steel at the time being expanded by the heat). While the surface steel is in this state of tension, and the central steel in this state of compression, the particles of the surface steel (by the strain) are displaced to a greater distance from each other, and the particles of the central steel (by the compression) are compressed into a denser state. The particles of the central steel being compressed into a denser state, it causes the central steel, after it has become quite cool, to occupy less space than what it did previous to hardening. The particles of the surface steel become hard while in this state of tension, consequently the hardened part of the steel becomes fixed, and cannot return to its original bulk; consequently, the hardened part of the steel occupies more space than what it did previous to hardening.

If the displacement of the particles of the outer steel predominates over the compression of the particles of the central steel, the piece of steel under operation will then be larger in dimensions. If the compression of the particles of the central steel predominates over the displacement of the particles of the outer steel, the piece of steel under operation will then be smaller in dimensions. In other words, if the expansion of the outer steel amounts to more than the compression of the central steel, the piece of steel will increase in bulk; if the compression of the central steel amounts to more than the expansion of the outer steel, the piece of steel will then decrease in bulk. The expansion of the steel is greatest when it is heated to a high degree of heat before immersion. This effect is owing to the particles being displaced at a still greater distance from each other, and which may, in some measure, account for the brittleness of steel when overheated. This expansion is, in some measure, reduced by tempering; and this effect is caused by the hardness being reduced and allowing the particles to partly rearrange themselves to their natural positions.

It is believed by some that the hardness of steel is caused by the compression of the whole of the particles into a denser state; in confirmation of this they say that steel after hardening always looks closer and finer in the grain. Now, if this were the only cause of steel becoming hard, how does the steel get larger in dimensions? Pieces of steel of all sizes would, according to this, universally become smaller. The compression of the particles of the central steel into a denser state certainly does take place, as I have before remarked, but the particles of the outer parts of the steel are displaced at a greater distance from each other, or the steel could not become larger in dimensions. It is believed by some that if a piece of steel (in hardening) increases in bulk in one part, that it must decrease in bulk in proportion in another part. Now, if this were the case, how is it that the specific gravity of some pieces of steel is reduced by hardening, and how is it that workmen have often to grind or lap pieces of steel to make them fit the same places which they fitted previous to hardening. It may be said that the steel may be prevented from fitting the place it previously fitted by becoming crooked or oval in hardening; but if this were the only cause, how could it be made to fit its place again by grinding or lapping? It would be impossible (unless it were softened and upset) to make the lean or concave side of it fit its place again. I may also inquire, what is the cause of steel being whiter in color after hardening? As I have previously remarked that it is only those parts of the steel which harden properly that increase in bulk, it may perhaps be asked, how is it that a piece of bar steel becomes shorter in hardening? The answer is that the central steel is compressed by the surface steel endways as well as sideways, by the surface steel contracting shorter by the loss of heat. The central steel contracts after the outer crust is fixed, consequently an internal strain is caused; and, if the steel becomes shorter than what it was previous to hardening, it is because the force of this internal strain shortens the outer steel more than it expands in hardening.

It is quite reasonable to suppose, if the particles of the hardened parts of the steel are removed to a greater distance from each other, that the steel would look considerably more open and coarser in the grain; consequently, it may be inquired, if it is not the compression of the whole of the particles into a denser state, what is the cause of steel looking closer in its texture after hardening? The answer is, if we accept the theory that it is the crystallization of the carbon which causes the hardness in steel, that the carbon expands in the act of crystallization (in a similar manner that water expands by extreme cold in crystallizing into ice) and fills up every pore or crevice, and gives the steel the appearance of being closer and more solid.

Such is a slight sketch of the expansion and contraction of steel; and, although a great deal more might be said, I have not thought it necessary to entangle the reader with a lot of theories, although it may be necessary for his amusement, and for the exercise of sound judgment, to occasionally glance at them in treating fully the purely mechanical operations.

The expansion of steel is prevented in some measure by annealing the steel about three times previous to its being finished, turned, or planed; for instance, after the first skin is cut from the steel it should be annealed again, after which another cut must be taken from it and again annealed, and so the third time. This may appear to some like frittering away time, but in many instances the time will be more than saved in lapping or grinding to their proper sizes after the articles are hardened, especially when it becomes necessary to lap or grind them by hand labor, for hardened steel works with great difficulty; therefore in some instances it becomes a matter of importance in hardening to keep the article as near as possible to its original size. I have myself had articles to harden which could not be lapped or ground to their finished dimensions in the turning lathe owing to their peculiar shapes, so that the workman has been compelled to adopt the slow process of lapping with a copper file and emery dust, mixed with oil. I have known those articles which were only once annealed, to take several hours to lap them to the finished dimensions after they were hardened; and I have known articles of the same kind, and of precisely the same dimensions (in their soft state), made from the same bar of steel and heated to the same temperature (as near as the eye could judge), and hardened in water of the same temperature, which have been annealed three times, scarcely requiring to be touched with the copper file after they were hardened. As there may be some persons who may perhaps require an article to be after hardening as near its original size as possible, and who may not perhaps be provided with such things as buffs, laps, or stones, I presume therefore that this hint will not be out of place in making those acquainted with it. Another hint deserves a place. I have found that articles

made of steel which have been well forged will always keep truer and keep their original sizes better in hardening, and be less liable to break in hardening, than articles which are made of the steel in the state it leaves the manufacturer; for instance, if a very long screw tap, or reamer, etc., be required for any special purpose, it will be well to take a piece of steel sufficiently large to admit of being forged to the required dimensions. If for a long screw tap, three quarters of an inch in diameter, seven eighths round-bar steel swaged down at a cherry-red heat to three-quarters and a sixteenth will suffice (the one-sixteenth is allowed for turning); but if the edges of seven-eighths square steel be hammered down so as to form eight squares and then swaged down to three-quarters and a sixteenth, it will prove even better for the purpose than the seven-eighths round-bar steel, it must be obvious that if similar methods be adopted with larger articles, they will be less liable to break in hardening.—*Ede on Steel.*

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Chicago Artesian Well.

MESSRS. EDITORS:—In two or three numbers of your paper I have read notices of this truly great and wonderful work, which, though originated and prosecuted upon theories outside of old fashioned mundane science, has proved more successful than any thing of the kind ever attempted in this country. The history of the work, as detailed by its principal agent, Geo. A. Shufeldt, Jr., is briefly this: A gentleman named Abraham James, claiming to act by spiritual impressions, pointed out the locality where the well is now flowing, and insisted that at a certain depth artesian water could be had by boring. Upon the strength of his representations the work was commenced, and water in large quantities, and, for deep well water, of very pure quality, was struck within a few feet of the depth he had designated, and flows out at considerable hight above the surface, at the rate of 1,200,000 gallons per day. As Chicago, before this proof was given, was not known by most people to be situated over the bottom of a geological "basin," the whole matter is considered by its projectors a signal proof of spiritual intelligence and communication. But the work being finished,—no matter by what authority,—its details show clearly, that instead of its being wonderful that an artesian well is obtained there, it is one of the most beautiful *proofs* of the truth of the common theory of such wells; and to demonstrate this is the object of this paper.

It is supposed by Agassiz and others that the first rocks which appeared above the primeval ocean upon this continent—and perhaps on the earth—are those which constitute the Laurentian Range, bordering Lake Superior and running outwardly to the Atlantic. What we know is—for the rocks testify to it—that on the outward slope of this range, along the Mississippi river and its eastern branches, as we go downward geographically, or hydrostatically, we go *upward* geologically; that is, the different stratas of deposited rock—many of which outcrop along the river's bank—all lie like the tiles upon the roof of a house, overlapping and running under each other; but—to follow out the figure, the eave of the house is the highest; and, of course, the water falling upon it would run under instead of over the stratas.

The first deposit upon the Laurentian (which is an igneous rock thrown up by internal convulsions), is what has been called by some the St. Peter's Sandstone. This commences on the St. Croix river, one of the principal eastern branches of the Mississippi, at about one hundred miles south of the lake, and fifty or more from the ridge which forms the watershed between the lake and all the eastern branches of the upper part of that river. For thirty miles along the St. Croix this stone forms its banks, into which it has cut its way in ages past to a depth of one hundred feet or more, leaving nearly perpendicular precipices upon each side.

This stone is impervious to water, and is probably the foundation stone of all that part of northern Wisconsin which abounds in tamarack, cedar, and cranberry marshes. It is covered with a thick deposit of drift, forming low hills of loose, pebbly soil, between which are the swamps and lakes, and some alluvial deposits. Following down the Mississippi river, this sandstone, which is called by the Iowa State Geologists the Potsdam Sandstone, is last seen near the north line of that State, and there dips under the lower Magnesian limestone, which in about forty miles dips under another thin bed of sandstone, over which soon commences the thick and extended deposits of the Galena, or lead-bearing limestone, the latter the principal rock of the river bluffs for over one hundred miles. A little north of the latitude of Chicago commences a bed of Hudson river shale, which is overtopped by a thick deposit of Niagara limestone, which disappears under ground at a point on the river exactly west of Chicago. From this point the geological deposits going south and east rise with great rapidity up to the coal measures of central Illinois, through various stratas of limestone, mostly of a fine building quality.

Now what I wish to show is, that the drill of the Chicago well penetrated through all these stratas, which were not wanting, until it reached and went through the St. Peter's sandstone, and struck the water which fell upon the earth along the Southern Laurentian slope, and has run beneath that bed of rock, ready to spout from any hole which reaches it. This, if true, would account for the great purity of the water as compared with other artesian fountains, as it has encountered on its way no soluble mineral substances, and was originally strained through the sand drift of upper Wisconsin.

The diary, kept apparently with great care during the boring of the second well, shows plainly that after going down about three hundred feet, through various limestones and marble, the drill struck the Niagara limestone, which forms the surface rock on the Mississippi, directly west of Chicago. It is described as a grey limestone, one hundred feet thick, with layers of flint. This description tallies exactly with the character of the stone exposed in the bluffs at this place. Underneath this was found a bed of shale, the same in character as that which lies below the limestone here, but which is still partially above the bed of the river. This proved to be about one hundred and fifty feet thick (here it has been bored into a great distance, but not through). From the bottom of this shale downward, the character of the rock is not so well defined in the diary. The Galena and lower beds of limestone seem to be wanting, and the drill appears to have reached the still lower sandstones, under which the water is stored.

The conclusions which I draw from the above are, 1st, That artesian water can be obtained at any point in this region by going deep enough to penetrate the St. Peter's or Potsdam sandstone; and 2d, That along the Mississippi river, as low down as the latitude of Chicago, it can be had at a depth several hundred feet less than at that place. C. B.

Lyons, Iowa.

The Cave of the Puy de Dome.

MESSRS. EDITORS:—In your issue of Nov. 9th, I notice a communication from "M. A. D." requiring a solution of a natural phenomenon existing in the south of France. As you intimate, the facts are scarcely correct, as represented by "M. A. D." They are these: In the locality mentioned a spring issues from underneath a deposit of lava, which is remarkably cold, sometimes even covered with ice, in the hottest part of the summer; and in the winter has a temperature exceeding that of the air surrounding. Now there is nothing very extraordinary about this spring, excepting its excessive coldness (exhibited by the production of ice) in excessively hot weather, and this wonderful quality so much dwelt on and exaggerated possibly, by the guides who conduct tourists to the mountain (Puy de Dome), admits of a very simple explanation to the educated man, though a great mystery to the uneducated natives, and to some of those who ought to know better. This explanation consists in the fact that the rock through which the waters of this spring percolate, is of a very porous texture; in the hot weather a very rapid and abundant evaporation takes place, which reduces the temperature and causes the water to escape at or near the point of freezing. At my visit there, there was no ice in the spring, though I was assured that the occurrence sometimes took place. Under the circumstances, it is possible, and I believed the assertion for that reason, and not because one is told so. In the winter, in cold weather, as a matter of course, the water would be warmer, and in certain states of the atmosphere would give off vapor, as other springs do under the same circumstances. This vapor is magnified into steam, and the double contrariety of cold in summer and heat in winter makes a pretty wonder for the uninstructed villager or traveler. Possibly the wonderful evidences of intense volcanic action to be seen here, predisposes one to be rather too credulous as to mysterious phenomena. HENRY STEWART.

Norristown, Pa.

Treatment of Kerosene Lamps.

MESSRS. EDITORS:—In your issue of Nov. 2, page 275, your correspondent "Experimenter" has given advice, which I cannot but think detrimental to the safety of the Kerosene burning public. He states that "if the wick fits the tube, it is impossible to drive the flame down into the lamp by blowing into the chimney," and further, recommends that method of extinguishing the lamp. Now your correspondent must be more fortunate in the possession of a good and perfect burner than nine-tenths of the people, for nine-tenths of all the burners used are made with *vent holes* along the side of the tubes, or in close proximity thereto, much larger in area, and much nearer the explosive mixture in the lamp than by way of the tube, with never so loose a wick as usually used.

The theory of lamp explosions, as I understand it, is this: First, Kerosene of itself is not explosive, nor is the gas which rises from it, but it is the admixture of that gas with a large body of air that makes it dangerous. Kerosene, or coal oil, is a dense body, which gasifies slowly, requiring, during the process of combustion in lamps as used, air to take the place of the oil consumed; this air, passing down by the heated tube through the *vent* holes, as before stated, becomes warm, and by its heat eliminating a certain amount of gas, small in proportion to its own incoming body. The prolonged burning of the lamp, say for four or five hours, reduces the quantity of oil, enlarges the space for the explosive gaseous mixture, and imparts also a great heat to the contents of the lamp, which then gives forth vapor more freely, so as finally to produce the proportion of one part gas to nine of air, which I take it is the maximum point. This heat also increases the volume inside the lamp, causing this dangerous mixture to exude by these same vents, close beneath the flame, then catching from some deflection of the flame or its proximity thereto, explodes the lamp while standing on the table, and more often still when carried in the hand, or in going down stairs. Thus it will be seen that to blow the flame *down* is to invite destruction, unless the burner is properly constructed, as comparatively few are. The proper method is to draw the wick into the tube by means of the ratchet, which, while avoiding danger, will prevent any odor arising from the oil in the wick. PENROSE CHAPMAN.

Brunswick, Me.

Artesian Wells—Why the Water Flows—Is it Centrifugal Force?

MESSRS. EDITORS:—A correspondent has published in a recent number of your journal, a theory of the nature of spouting water, in which he attributes the discharge of the water to the centrifugal motion of the earth—the tendency of matter to fly from the center. I have heard this opinion advanced before, and the existence of perennial springs, on the Adelsburg mountains in Switzerland, and in other places, adduced as evidence in support of the theory, but I do not believe it to be founded on fact.

I bored the Chicago Artesian; they are 711 feet in depth; they commenced filling with water at a distance of ten feet from the surface, and continued full of water all the way down. Why did not the centrifugal force throw this water out? and why was no water discharged until the drill had penetrated a particular subterranean stream? Before this point was reached there was plenty of water in the wells, and we could pump out an abundant supply; and this is true of hundreds of other artesian wells scattered throughout the country, they do not discharge the water above the surface, but plenty of it can be obtained by pumping. Why does not the centrifugal force throw the water out of these wells? And why do they not all become flowing wells, as would be the case if the theory were true? Or, in case of dry wells, why does this force not throw out the stones and chippings of the drill as well as the water? For these reasons I am inclined to adhere to the opinion that water, in flowing wells, comes from a higher source, and that the crust of the earth is everywhere penetrated by these underground streams to an extent of which at present we have no conception. For the benefit of another of your correspondents I here state that the temperature of the water in our wells is 57° Fah., and is uniform winter and summer. It was incidentally mentioned in your paper that the flow was intermittent: this is not the case; but it is without change in quantity or force all the year round. The form of the overflow resembles the white plume of a soldier, and is extremely beautiful. GEO. A. SHUFELDT, JR.

The Philosophy of the Soap Bubble.

MESSRS. EDITORS:—On page 291, No. 19, current volume of your famous journal I find a communication from Mr. Alfred O. Pope, detailing his experiment by which he imagines he has proved Sir David Brewster's theory regarding the color of soap bubbles. I do not find fault with the experiment, but with the deductions drawn from it. He does not tell us how his experiments prove that secretions were formed and until he demonstrates that they were formed he has not proved Brewster's theory. All admit that the thicker the film of the bubble the brighter the colors will be. Oleate of soda and glycerin in solution make a thicker film than a solution of common soap. Consequently, when the liquid begins to flow down the sides of the bubble and collect in drops at the bottom the top gets thinner and the colors then become paler and there being a constant change in the thickness of the film all over the bubble there is as constant a change of color until a deep blue or black makes its appearance at the top of the bubble which becomes so thin that the cohesive force is overcome by the weight of the sides and bottom, and the bubble bursts. CHEMIST.

Cincinnati, Nov. 5, 1867

Recipe for Making Boots Water Tight.

MESSRS. EDITORS:—As the cold, muddy weather of fall is approaching, it may be of interest to many of your readers to know how to preserve their boots and make them at the same time pliable and water proof. It can be done in this way: In a pint of best winter-strained lard oil, dissolve a piece of paraffine the size of a hickory nut, aiding the solution with a gentle heat, say 130° or 140° F. The readiest way to get pure paraffine is to take a piece of paraffine candle. Rub this solution on your boots about once a month; they can be blacked in the meantime. If the oil should make the leather too stiff, decrease the proportion of paraffine, and *vice versa.*

I have used this for eight years past, and boots have lasted me two winters, the uppers always remaining soft, and never cracking. I have tried beeswax, rosin, tar, etc., but never found any other preparation half so good. C.

Dayton, Ohio.

ARTIFICIAL RUBIES, not mere copies in glass, but made veritably out of the same substance—alumina—of which the natural gems are composed, have been produced by M. Ebelsman of the Sèvres Porcelain Works, near Paris. The process consists in employing a solvent, which shall dissolve the mineral or its constituent, and may thus, either upon its renewal or by a diminution of its solvent powers, permit the mineral to aggregate in a crystalline state. Certain proportions of alumina, magnesia, oxide of chromium, or oxide of iron, and fused boracic acid, are placed in a crucible made of refractory alumina enclosed in a second one, the whole being exposed to a high heat. The materials are first dissolved in the boracic acid, then as the heat continues, the latter evaporates, the alumina and coloring matter combine, crystallize, and present the exact appearance of the spinel ruby. In this way crystals of the same form, hardness, color, composition, specific gravity and effect on light, as the cymophane, and other precious stones are prepared.

WINE CONTAINING ZINC.—Dr. Wittstein has recently found that most European wines contain zinc in the form of salts, its presence being due to the fact that the isinglass used in purifying the wine is adulterated with about 2½ per cent of oxide of zinc.

THE CHEMISTRY OF METEORITES.

M. Daubrée, already so distinguished for his researches on metamorphism, has recently published the results of his Synthetical Experiments on Meteorites, and has thus brought before us, from an entirely different point of view, an inquiry into the nature and origin of the silicated magnesian rocks and minerals.

M. Daubrée first describes his experiments on *the imitation of the meteoric irons.* The most characteristic feature of these masses is the crystalline pattern, which is brought to view on a polished surface by the action of an acid. Simple fusion of the meteorite of Caille (Var) in a *brasque* of alumina (to avoid the contact of carbon, which would have combined with the iron), was insufficient to reproduce the appearance, although the resulting substance was certainly crystalline. Further experiments, in which soft iron was associated with some of the other substances that commonly accompany meteoric iron, such as nickel and protosulphide of iron and silicon, yielded a highly crystalline result, but not yet of the true character. If, however, to the soft iron was added phosphide of iron, in the proportion of from two to five or ten per cent, and, still better, if there was introduced at the same time nickel, and if a mass of as much as two kilogrammes in weight was operated on, there appeared, when the cooled lump was polished and etched, in the midst of dendritic patterns of great regularity, lines of a brilliant material dispersed in a reticulated form.

A third mode of attempting the imitation was that of melting down certain terrestrial rock substances, as peridote, lherzolite, hypersthene, basalts, and melaphyres. By this means specimens of iron were obtained which, both in composition and structure, bore strong resemblance to many of the siderolites. Especially was this notable in the metal obtained from the lherzolite of Prades (Eastern Pyrenes). These artificial irons were then found, like the natural meteoric ones, to contain nickel, chromium, and phosphide of iron, the latter in long needles recalling the appearance of the natural patterns.

Imitation of the Meteoric Stones.—Contrary to what might have been expected from the appearance of the black vitrified crust on the surface, the substance produced by the melting down of meteorites obtained from above thirty different falls, was in every case highly crystalline. Those of the common type present a group of metallic granules, disseminated in a stony mixture of peridote and enstatite, the former generally on the surface as a thin crystalline pellicle, the latter in the interior as long acicular crystals. A notable contrast was yielded by the aluminous meteorites, such as those of Juvinas, Jonzac, and Stannern, which produced, instead of crystalline, a vitreous mass.

But perhaps the more remarkable results were those obtained synthetically by melting down pieces of rocks characterized by the minerals peridote and enstatite. For this purpose peridote (olivine), from the basalt of Langeac (Haute Loire), and lherzolite, from Vicdessos and Prades, were fused in earthern crucibles. They melted easily and yielded crystalline substances, the latter especially closely resembling the original rock. The proportion of enstatite (the bisilicate of magnesia) was found to be increased by the addition of silica.

When similar mineral substances were melted in presence of a reducing agent, the iron (which in the other case remained combined in the silicate) segregated itself in grains of various sizes, separable by the magnet. Thus a perfect analogy was established between the above rocks and the meteorites, as well in the stony minerals as in the iron, which always contained nickel.

Furthermore, some remarkable characters in the structure of the stony meteorites were found to have been imitated, especially the delicate parallel lines attributed to cleavage, which are visible when a thin slice is examined under the microscope, and the globular structure where the little spherules are sometimes smooth at the surface, at others drusy, or roughened with the points of minute projecting crystals, like the meteorite of Sigena, November 17, 1773.

When hydrogen was employed as the reducing agent, the results were very similar, and the reduction would take place at a temperature not exceeding red heat.

Again, another method of imitation, the reverse of the foregoing, was by oxidation. From silicide of iron, heated in a *brasque* of magnesia by the gas blowpipe, a substance was obtained extremely similar to the common type of meteorite. The iron was separated partly as native iron, partly as a silicate, forming peridote, some of it in the crystallized state. Further details of resemblance were attained by heating a mixture of silica, magnesia, and nickeliferous iron, phosphide and sulphide of iron. The stony gangue of the melted product was found to be free from the latter three substances; and instead of the simple phosphide introduced in the experiment, there was observable the triple phosphide of iron, nickel, and magnesium, first noticed by Berzelius in meteoric irons.

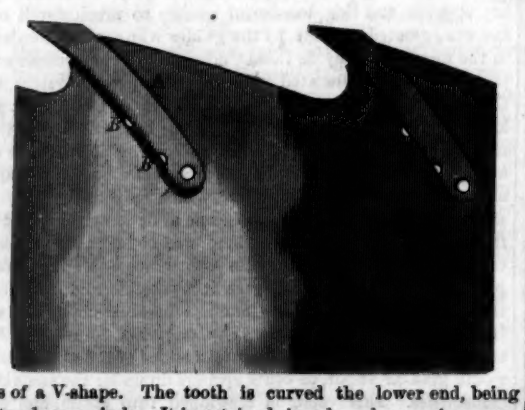
The preceding experiments suggest some important deductions on the condition of the planetary matter from which the meteorites have been diverted to our own globe. M. Daubrée makes no attempt to enter the lists with Von Haidinger, Baron Reichenbach, Prof. Lawrence Smith, and others, on the questions attending the entry of these bodies into our atmosphere, and the circumstances of their fall; but, considering that their surface alone is modified by these conditions, he infers that their interior mass remains the same as when it was wandering in space, and may to a great extent be taken as a sample of the material of the planetary bodies of which they are the fragments.

Seeing how nearly the composition and structure of the meteorites are reproduced by the two methods of experiment, M. Daubrée refers by their aid to the original mode of formation of the bodies from which these meteorites come.

If they were produced from silicated minerals by reduction, in which carbon was the reducing agent, it may be objected that the iron could scarcely have remained in the metallic state; and if hydrogen be supposed to have been the reducing agent, water ought to have been formed at the surface, whence it appears more simple and reasonable to recur to the idea of an oxidizing process. Allow that silicon and the metals existed at one time in the meteorites, not combined with oxygen as they now mostly are, and this by reason either of too high a temperature to allow them to remain in combination, or of too great a separation of their particles, then, as soon as, by their cooling down or by their condensation, the oxygen was able to act upon the other elements, it would at once combine freely with those for which it had most affinity, and if not sufficient in quantity to oxidize the whole, or not enabled to act long enough, would leave a metallic residue. In fact; there would be produced the silicate of magnesia and iron, peridote or olivine, and granular portions of nickeliferous iron and of sulphides and phosphides of iron. These views, while applicable to a large proportion of the meteoric bodies, would require modifications for those rarer varieties which consist essentially of pyroxene and anorthite. While the magnesian silicates crystallize so readily after simple fusion, these latter substances would only melt to vitreous and amorphous masses, and in order to become crystalline would have needed the presence of water.—*Address to the Geological Society*, 1867.

CLEMSON'S ADJUSTABLE SPRING-HELD SAW TEETH.

The engraving shows a saw tooth differing not only in form but in manner of being retained in place, from others. Its simplicity of shape and consequent ease of manufacture and management is one of its advantages, while the form of the slot as compared with that of the tooth is another. The tooth is dovetailed, or rather its edges conform to the slot, which



is of a V-shape. The tooth is curved the lower end, being struck on a circle. It is retained in place by a spring pressure as the curve of the slot in the plate differs slightly from that of the tooth, as seen at A. When partially worn the teeth may be moved outward from the center of the plate although still held by the spring of the tooth. When, however, worn quite short, the two halves of the holes, B, in the plate and tooth may be brought together and a pin or screw inserted. This is only necessary when the tooth is removed so far from the slot as not to be affected by the spring of the tooth against the plate. These half holes may be several in number, if required, but it is found in practice that one on the plate and one on the tooth is sufficient. The dissimilarity of the curvature in the tooth and the slot in the plate amounts to about one-sixteenth of an inch.

The patent of Aug. 14, 1866 claims holding the teeth by elastic pressure, which is the peculiarity of the device, and others are being secured by a pending application through this office. Address for further information William Clemson Middletown, N. Y.

COATING IRON WITH COPPER.

The *Mechanics' Magazine* furnishes the following account of a simplified process of copper plating employed in the extensive electro-metallurgical establishment of M. Oudry, located in the village of Auteuil, three miles out from Paris. Such complete success has attended the introduction of this new method of depositing copper upon wrought or cast iron, that the inventor and founder of this establishment, relinquishing to his compeers the ordinary applications of copper plating which are limited to articles intended principally for purposes of interior decoration, produces chiefly such articles connected with the external decoration of stately and superb edifices, which are, therefore, exposed to all the destructive effects of air and water, to the deteriorating alterations of heat and humidity, and to the corroding action of gas and frost. To M. Oudry was entrusted the plating in copper of all the cast iron monuments of the city of Paris, including the fountains of Venus and Diana in the Champs Elysees, that of Visconti in the Louvais square, that of the four seasons, and the monumental designs which embellish the Place de la Concorde. Among other works deserving notice is the reproduction in galvanoplastic of the bas-reliefs composing the Trajan column, exhibited at the Louvre, and the surface of which cannot be less than 700 square yards in extent.

Were people in general to know the price paid for success in any department of scientific knowledge and application, it is very questionable whether they would not be more inclined to pity than to envy the representative. The present proprietor of the establishment at Auteuil has had his due share of labor and anxiety in bringing the art to so high a degree of perfection. For many years he was engaged in conducting experiments of a troublesome and complicated nature, in order to arrive at his end, which was copper plating of any required thickness upon cast and wrought iron by a direct operation. This was the only method, in his opinion, available for effectually resisting oxidation, when the specimens plated possessed a large area of surface, together with numerous details of tracery, graving, and ornament. Similarly, this was the only plan which promised success in plating bodies composed of several pieces and connected together by bolts or rivets, and which might be exposed to stain and friction, such as pistons, screws and armor plates. Under the same category may be included substances undergoing a heavy pressure, such as rollers. All these require not merely a plating of copper, as understood by the ordinary term, but absolutely a thick crust of copper upon them. To obtain this result it was necessary to immerse the objects in a bath of sulphate of copper, and to keep them there for several days in the presence of an electrical current. It was found that if the pieces were cleaned and plunged into a preliminary bath to obtain a superficial film, and then transferred to a bath of a stronger and more acid nature, the iron, owing to its impurities, having been but imperfectly cleaned, and consequently but very slightly coated, was at once attacked by the acid, and the result was the very reverse of what was desired. Instead of the object being plated, it was rapidly corroded and destroyed. After many attempts to succeed by the use of two successive baths of different strengths, M. Oudry was compelled to renounce the endeavor and to turn his attention to another plan of operation. The one he has finally adopted consists in discarding the preliminary bath and the cleaning, and replacing them by a fluid coating of an isolating and impermeable character. By this new process, the exact *modus operandi* of which is a secret, the monuments we have alluded to were plated, together with 20,000 gas lamps and fittings ordered from Auteuil for the city of Paris. These lamps are composed of a pedestal and shaft, the former of which is seldom retouched, but the shaft is generally adorned with garlands, and requires to be filed up. This having been done, the workmen cover the surface with a very thin film of benzine, and so soon as this coating is dry a second, and then a third, is applied, the whole three operations embracing a period of three days. Subsequently, the surface is rubbed over with charcoal powder, and then it is fit for the plating. Any part that is not required to be plated is covered with a paste of some conducting earthy substance. The objects having been duly prepared are transfeared to large wooden vats containing the baths, are tied together with copper wires, and surrounded with numerous earthern jars of a porous description, in which are placed plates of zinc furnished at the top with strips of copper, to which are attached the conducting wires encircling the objects to be plated. The contact of the copper and the zinc sets up the galvanic action which commences directly the earthern jars are filled with dilute sulphuric acid, and a saturated solution of sulphate of copper is introduced into the vats. The strength of the solution is maintained constant by supplying or feeding it with crystals of the sulphate of copper. Notwithstanding that the theory of the process depends upon these conditions being fulfilled, yet the beauty of the plating and the practical success is very much due to the thousand and one little devices and dexterous manipulations only to be acquired by long practice and experience. About three or four days suffice to render the operation complete, the thickness being the 1-25th part of an inch, and the objects are then taken out of the bath, washed in water slightly acidulated, brushed with a wire brush, and rubbed with green paper to relieve the dull tint the newly plated copper assumes. The finishing touches consist in brushing the objects with a brush steeped in a preparation of ammoniacal acetate of copper, which attacks the surface of the fresh coating, and imparts an agreeable greenish tint to it, and finally rubbing them with a hard brush well waxed.

Our readers will recognize in the battery adopted at the establishment of Auteuil, that of the well known Daniell's constant battery, the especial feature of which is to furnish regular currents of uniform intensity, by means of the partition separating the two liquids, and through the pores of which they come into contact. In all these substitutions for solid metal of the same nature as the superficial film, the question of cost enters largely, and a few remarks will be *apropos* to the subject. A gas lamp of the newest pattern, in Paris, weighs 4¼ cwt., and costs, including casting, filing up, copper plating, and bronzing, exactly £8, being at the rate of a fraction under fourpence per pound. The same article cast in bronze will only weigh, in consequence of the reduced thickness, 2¾ cwt., but owing to the price of that metal the cost would amount to a trifle over £30. It has been estimated that the difference between these two specimens for the whole city, amounts to a saving of nearly half a million pounds sterling. The Emperor of the French has marked his approbation of the energy, enterprise, and skill of M. Oudry, by presenting him with the cross of the Legion of Honor; and all those who have witnessed the success which has attended his efforts at the Exposition, will concur in the opinion that the honor had been well earned and deservedly merited.

CASTINGS IN SOFT STEEL.—It is noted as a fact in casting steel to patterns, that Messrs. Vickers, Sons & Co., of Sheffield, Eng., have cast a hydraulic cylinder 8 inches in diameter and 2½ thick, perfectly sound and malleable. The Wm. Butcher Steel Works, Philadelphia, Pa,, have recently cast a hydraulic cylinder 12 inches in diameter and but 1¼ inches thick, perfectly sound and malleable, which is a much more difficult casting to make, on account of the thinness of the metal.

Artificial Grindstones.

We have already noticed in this journal the success which has attended the application of Mr. Ransome's beautiful process to the manufacture of artificial grindstones—a success which is so marked that there seems little doubt that the use of natural stones for grinding purposes will eventually become the exception instead of the rule. Among other firms, Messrs. Bryan Donkin & Co., the well-know engineers, of Bermondsey, have tried experiments which very decisively prove the advantages of the artificial over the natural stones. Messrs. Donkin were first supplied with a pair of Mr. Ransome's artificial grindstones in December last; and early in the present year they carefully tested these stones and compared their efficiency with some Newcastle stones at their works. Both the natural and artificial stones were mounted in pairs on Muir's plan—a system in which the peripheries of the two stones of each pair rub slightly against each other, with a view of causing them to maintain an even surface—and the two sets of stones were tried under precisely the same circumstances, except that the Newcastle stones had a surface speed more than 20 per cent greater than that of the others.

The trials were made as follows: A bar of steel, ¾ in. in diameter, was placed in an iron tube containing a spiral spring, and the combination was then arranged so that the end of the bar projecting from the one end of the tube barely touched one of the artificial stones, while the other end of the tube rested against a block of wood fixed to the grindstone frame. A piece of wood of known thickness was then introduced between the end of the tube and the fixed block, and the spiral spring, being thus compressed, forced the piece of steel against the grindstone. The same bar of steel was afterward applied in the same way, and under precisely the same pressure, to the Newcastle stone, and the times occupied in both cases in grinding away a certain weight of steel from the bar were accurately noted.

The results were that a quarter of an ounce of steel was ground from the bar by the artificial grindstone in *sixteen minutes*, while to remove the same quantity by the Newcastle stone occupied *eleven hours*, and this notwithstanding that the surface speed of the latter was, as we have stated, more than 20 per cent greater. Taking the 20 per cent greater speed of the Newcastle stone into account, it will be seen that the 11 hours run by it were equal to 13¾ hours at the same speed as the artificial stone, and the proportional times occupied by the two stones were thus as 16 minutes to 13¾ hours, or as 1 to 52, nearly!

Such a result as this is something more than remarkable, and it is one which would scarcely have been credited, even by those who made the experiments, if it had not been fully corroborated by subsequent experience in the working of the artificial grindstones. Since the experiments above described were tried, Messrs. Donkin have set another pair of the artificial stones to work, and these, which are now in regular use, have given more satisfaction than those first tried. The saving in time, and consequently, in labor, effected by the use of the artificial grindstones is, in fact, so great that Messrs. Donkin have determined to use these stones exclusively in future; and we may add that the artificial stones are so much preferred by the workmen that those men, even, who are employed in shops at some distance from that in which the stones at present in use are situated prefer taking the trouble to go to them to using the Newcastle stones in their own shops. In addition to their great efficiency, the artificial grindstones possess the advantages of being able to be manufactured of any size, and of any degree of coarseness of grain, and they can thus be specially adapted to any particular class of work, while the process of their manufacture insures their being of uniform texture throughout, and free from the flaws and hard and soft places found in natural stones. Altogether, we believe that the general adoption of the artificial grindstones is merely a matter of time.—*Engineering.*

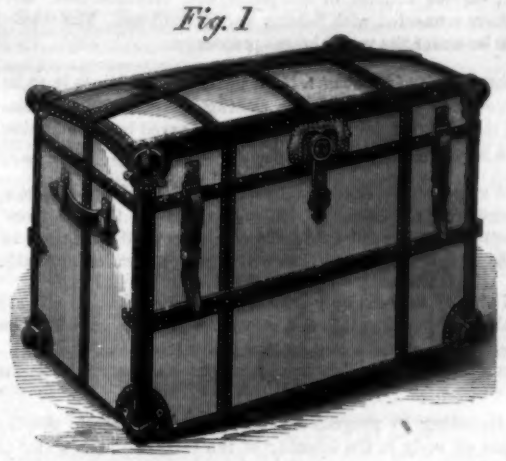
Mutability of Species.

In a recent communication to the Geological Society of Paris, M. A. Gaudry pointed to some striking facts favorable to the theory of the mutability of species. The sand pits in the environs of Paris, and indeed all drift deposits in general, are very rich in remains of the mammoth or primitive elephant, and of the *elephas antiquus*. These remains chiefly consist of molar or back teeth, in which characteristic differences may be easily recognized. They consequently pertain to two different species, and in order to ascertain whether there exists any close parentage between them, M. Gaudry goes back to the pleistocene period, which lies between the upper tertiary or pliocene, and the drift strata. Now the pleistocene forest-bed of Norfolk contains a quantity of molars of each of the above species, but it also comprises others slightly differing from both, and also intermediate between those of *elephas antiquus* and *elephas meridionalis*, the latter ceasing to exist when the former and the mammoth begin. These again disappear after the drift, and are followed by other species. Here then we perceive a succession of species, each of which have sprung from the preceding one. During the tertiary period there existed a breed of horses to which palcontologists have given the name of *hipparion;* they had small lateral fingers, thus forming a link between pachydermata and solipedes, which latter was considered perfectly distinct so long as the genus *equus* was characterized by a single finger at each foot. Now, Mr. Owen, on examining the horses' teeth found in the cavern of Oreston, discovered that the *equus plicidens* to which they belonged was intermediate between the hipparion and the present horse. In the *equus plicidens* the enamel of the teeth presents more folds than in the living breed; but in the molars found in our gravel pits, M. Gaudry has perceived gradations between those presenting many and those presenting fewer folds, whence he concludes that our horse is a descendant of the *equus plicidens.* A hippopotamus, the remains of which were discovered at Grenelle a few years ago, appears not to differ materially from the race that now inhabits the rivers of Africa; and yet at the time the owner of these venerable relics was disporting himself in the Seine, the climate was much colder here than it is now; so that Mr. Gaudry concludes with great plausibility that, if we had the whole skeleton, some differences would probably appear.

HOUSE'S IMPROVEMENT IN TRUNKS.

Whether unjustly or not, the porters and baggage men employed at our hotels and railroad stations have been characterized as "baggage smashers," a term for which the trunk makers may be partially responsible. Wherever the fault may be it is certain that much damage and injury to

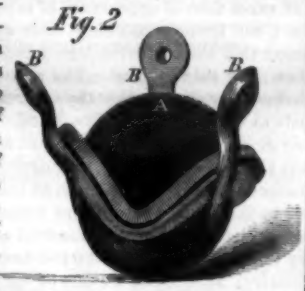
Fig. 1



property, often of a fragile nature, ensues when one is compelled to travel. Almost invariably a severe blow on the corner of the trunk will break the back or burst the trunk. The object of the contrivance shown in the accompanying engravings is to prevent a portion, at least, of this damage by providing cheap but efficient guards. One of these is seen detached in Fig. 2, and its application to a trunk exhibited in Fig. 1.

A frame of malleable metal—either malleable iron or cast brass—encompasses a triangular cup of thick vulcanized rubber, shown plainly at A, Fig. 2. This cup is formed with a flange which rests on the bars of the metallic frame. Each of the three prongs, B, of the frame have screw holes by which the shield is attached to the corners of the trunk. The appearance of the trunk or chest when these are attached is clearly exhibited in Fig. 1 without the necessity of further reference.

Fig. 2



It is easily seen that these fixtures can be quickly secured to any trunk, chest, valise, etc., and while preventing the jar and breaking of the trunk or its contents, render both more secure. To those who travel—and everybody travels more or less nowadays—this simple device will recommend itself. The elasticity of the rubber and its resistance to abrasion insures great security.

It was patented Feb. 1866, by J. A. & H. A. House. For particulars J. C. Gillmore, agent, may be addressed at No. 26, Fourth Avenue, New York city: Mr. Gillmore sells either the trunks with improved attachment or furnishes the shields to trunk manufacturers.

The First Steam Voyage Across the Atlantic.

The importance of the navigation of the ocean by steam first came to be fully realized in this country in the year 1818. Many scientific men doubted the feasibility of such navigation, but there were a few men of intelligence and enterprise who had the greatest faith in its practicability. Among this latter class was Mr. Scarborough, of Savannah, Ga., the senior partner of the firm of Scarborough & Isaacs, one of the leading commercial houses in the South. In 1818 Mr. Scarborough, willing to show his faith by his works, came to New York and made purchase of a ship of about 350 tuns burthen which was then on the stocks, determinated with her to settle the mooted questions as to the ability of steam vessels to successfully navigate the ocean. The ship was named the *Savannah.* Mr. Scarborough then engaged the services of Captain Moses Rogers, a person we are informed "of great mechanical skill and ingenuity, who had been familiar and identified with the experiment of Fulton." Captain Moses Rogers was placed in charge of the engine and machinery of the *Savannah.* An able and faithful sailor was now wanted to navigate the vessel, and such a man was now found in Captain Stevens Rogers of this city. Under his command the *Savannah*, having been duly equipped with engine and machinery, steamed out of New York harbor on the 27th day of March, 1819, bound to Savannah on her trial trip, which was most successfully made.

On the 26th of May in the same year she left Savannah for Liverpool, making the trip in twenty-two days, during eight een of which she was propelled by steam power. From Liverpool the *Savannah* went to Copenhagen, Stockholm, St. Petersburgh, Cronstadt and Arundel, and from the latter port returned to Savannah, making the passage in twenty-five days.

The log book of the *Savannah* was sent to the Navy Department in 1848. Captain Stevens Rogers is yet living in this city. For a number of years past he has been collector of city taxes, but at the election in June last he was suspended. It has been often suggested that it would be no more than a simple act of justice on the part of the government to settle a pension upon the pioneer of ocean steam navigation, but no active steps have as yet been taken to accomplish the substantial recognition of his services.—*New London Star.*

Editorial Summary.

THE GLACIAL EPOCH.—At a late meeting of the New York Lyceum of Natural History, Mr. J. W. Reid presented a paper on the drift deposits of the United States. He accounted for the intense cold necessary to produce the immense glaciers of that period by the precession of the equinoxes, which, every 10,500 years, has the effect of transferring the great oceanic waters from one hemisphere to the other, the sun at that period remaining eight days longer in one hemisphere than in the other. At present, the winters of the southern pole are eight days longer than with us; an ice continent more than twice the area of Europe has formed there, and a map will show the great preponderance of water in the southern hemisphere. The extreme of cold at the Antarctic pole was reached in 1248, since which date the climate has been growing milder, while north of the equator it has been growing colder, and but ten thousand years remains before the temperature which twenty thousand years ago formed glaciers reaching to the top of Mount Washington, will be the prevailing one of North America.

ROSY AURORA.—Among the latest explanations of the red glow and splendor of sunrise and sunset, which has been given, is that of Dr. E. Lommel, in Poggendorff's *Annalen*, in which he shows it to be an effect of diffraction of light as viewed through a series of dark or partially dark screens. He lays it down as an axiom that a point of white light, viewed through a sufficient number of groups of screens, appears not merely reddish itself, but also is surrounded by a still more strongly red-colored aureole of diffracted light. The lower strata of the atmosphere is full of minute corpuscular bodies—dust, organic and inorganic, carbon or watery particles—which serve as dark screens, and when the sun is low, the rays traversing a long range of atmosphere, undergo diffraction, and by superimposition of adjacent points of light, the effect of redness is deepened. A mere red glow, without brilliance, is occasioned by solid particles, as we see the sun red when viewing it through smoke, aqueous vapor, when present in the air, makes a diffused reddish light.

A GRAND ENTERPRISE.—The French government contemplate a new and vast project, which if carried out will be of incalculable importance to that nation. This is to enlarge the *Canal Deux Mers*, so that large vessels may pass directly from the Atlantic ocean to the Mediterranean, without passing under the guns of the fort of Gibraltar. At present the canal connects with the Garonne river at Toulouse, and falls into the Mediterranean near Agde; the river reaching the ocean at Bordeaux completing the chain of communication. In order to fill the canal when it is enlarged, it is proposed to intercept the innumerable mountain streams, from the Pyrenees and mountains of Auvergene, and imprison them in huge reservoirs whence the water can be drawn as needed.

TESTING SWORD BLADES BY MACHINERY.—The Austrians fasten the sword by its haft into a frame and submit it with a known and adjustable velocity, to a certain number of strokes at the mid length of its edge against a block of beech wood. The sword is also subjected to a slanting or glancing blow at a given angle and velocity against the side of a cylinder of hard wood. The edge is tested by blows against a piece of wrought iron of a given breadth, and proof of the blade's elastic temper is obtained by bending and suddenly releasing it within certain limits. The peculiarity of these trials is that the nature and extent of every test is determinative and may be made adjustable.

PRESERVING GRAIN by storage in a vacuum is a plan recently recommended by an English gentleman, Dr. Louvel. This gentleman proposes constructing large sheet iron cylinders, which are to be filled with the wheat or corn, and the air exhausted as far as possible by an air pump. The inventor has placed in a cylinder of the kind, wheat that had lain in a river for twenty-four hours, and become saturated with moisture. At the end of five days it was found in excellent condition, and made first rate flour and bread. A more practical application of this plan seems to be for the preservation of ship's biscuit from weevils and other parasites.

THE insuring of steam boilers and other property affected from explosions is the object of a new company recently started at Hartford, Conn. Heretofore, there have been no companies in this country which have issued policies covering this class of risks, although in England they have been in successful operation for a number of years. We are very glad that manufacturers and others requiring the use of steam can now insure themselves against loss in event of an accidental explosion, if fire does not ensue from the result. The name of the new company is the Hartford Steam Boiler and Inspection Company. Capital $300,000.

THE ADVANTAGES OF A STOVE-PIPE HAT.—Every reformer and most of our writers have something to say condemnatory of the stiff high crowned hat and advocate the soft felt hat as a substitute. While the Hon. Charles Sumner was recently inspecting a sleeping car on a Michigan railroad the train suddenly started. This threw him forward and he struck the ground with his hat, damaging that article considerably, and inflicting a slight injury on his head and face. Had Mr. Sumner worn a felt hat, his head instead of its covering would have sustained serious injury. The stove-pipe hat will undoubtedly have one distinguished advocate at least after this.

TEXTILE FROM HOP VINES.—Another discovery in the field of textile material, is that of a Belgian, who has shown that a second, most valuable, and heretofore useless product, can be furnished by the hop vine. After the hop blossoms have been gathered, the stems are steeped like hemp; when this operation has been completed the stalks are dried, beaten with a wooden beetle, and then the threads come off easily. After carding and working in the ordinary way, a very strong cloth is obtained. The thickest stalks also yield the material for several kinds of rope.

WHERE THE MONEY GOES.—A letter from a lady in Paris, just received, says: "Never will so many Americans be in Paris at one moment again;" and she added, "what a deal of money they leave. I know some New York and Western ladies who have bought such quantities of laces. Every lady who comes to Paris must buy a real black lace shawl and silks. One lady bought twenty thousand dollars' worth of European luxuries, mostly for presents to friends, and one gentleman, on his way to his Western home, takes fifteen trunks filled with laces, silks, etc."

THE SPECTRUM TEST.—So delicate is the spectrum test in determining the presence of certain metals that it is possible to recognize in this way the 1-60,000th part of a grain of potassa or baryta; the 1-1,000,000th of a grain of lime or strontia; the 1-60,000,000th of a grain of lithic, and the 1-160,000,000th of a grain of soda. Dr. Letheby, a distinguished London chemist, has detected by this means the presence of blood in the stains of linen which had been laid away for seventeen years.

HOW TO PRESERVE EGGS.—In 1791, Wm. Jayne, of Sheffield, England, obtained a patent upon the following method which he averred would preserve eggs in a good and fresh condition for two years or more:—Keep the eggs in a compound made of 1 bushel quick lime, 32 oz. salt, 8 oz. cream of tartar, with enough water to form a mixture so that an egg will swim with its top just above the liquid. If any of our readers should test this simple method we should be glad to hear the result.

FOR POLISHING STEEL.—A German engineer states that oxide of chromium is the best substance for polishing steel. The article can easily be prepared by heating bi-chromate of potash to redness. It is also used for painting on porcelain. One equivalent of chromic acid is reduced to oxide of chromium, and on well washing the residue of the ignition neutral chromate of potash is washed away and the oxide is left behind.

COLORING WOOLEN YARN.—An agricultural exchange asserts that yarn, plain or mixed, can be colored a firm blue, even superior to that attained with indigo, by mixing common purslane (*portulaca oleracea*) macerated fine, and boiled for some hours with logwood chips, in the proportion of a half bushel of the former and quarter of a pound of the latter. Two ounces of alum is used as a mordant for every pound of wool.

THE AGE OF INVENTION.—It appears from the records of the Patent Office, that in 1864 the number of applications for patents was 6000; in the following year the number increased full fifty per cent; in 1866, 15,000 applications were filed, and this year will probably increase the number to 25,000. The number of caveats filed last year was twenty-seven hundred, and this year there will be upwards of four thousand.

HOW TO REMOVE FOUL AIR FROM WELLS.—Ebenezer Robinson, of Philadelphia, Pa., suggested, in 1793, a very quick and simple method of removing foul air from wells, cesspools, etc. He says he found the plan to succeed even where the air was so bad that neither flame nor life could be supported. His plan was to lower a leathern hose pipe into the well, and by means of a large bellows, inject fresh air.

THE MUD CROP OF PARIS. Among the many economies of municipal administration in Paris is the sale of the yearly "mud crop." In 1823 this yielded only $15,000. It now brings $120,000, and when left for some time in rotting tanks is sold for manure, at the increased valuation of $600,000. If we could but make the mud crop of our American cities equally profitable!

MULTUM IN PARVO.—A very neat and convenient article in the shape of a pen holder has been introduced to the public by the Morse Eraser Company, of Philadelphia. It combines with a pen holder of ordinary shape and size, a pencil sharpener, eraser, and burnisher. Add to it a penknife, which can be easily done, and the article will be complete.

THE NEW PLANET recently discovered by Prof. Peters, of Hamilton College, N. Y., and at very nearly the same time by Prof. Tietjen, of Berlin, makes up the full number of these heavenly bodies now known to one hundred. The name of Undina has been given to the stranger.

A PARTY of capitalists recently visited Marsh's Railroad, (an illustrated description of which was published in this paper before the enterprise was commenced), which is being built on the summit of Mount Washington, and a new company has been organized, fixing the capital at $200,000. The Giant's Grove is being graded previous to erecting a large hotel on it, and the turnpike has been completed from that point to the railroad at the foot of Mount Washington. A little over a mile of the railroad has been constructed, and it is expected the balance will be finished next year.

THE MARITIME INTERNATIONAL EXHIBITION, which is to be held next year at Havre, promises to be interesting, as it will certainly be in many circumstances novel. The idea of it was suggested by the circumstance that the marine productions and objects connected with them have necessarily been only partially represented in the Champ de Mars. There are to be three classes of subjects: navigation and life-saving apparatus; various articles of commerce and manufactures; and matters connected with fishing and pisiculture. The whole is to be under the very highest patronage.

THE establishment of a National School of Mines is to be proposed in Congress at the coming session. It is estimated that $10,000,000 per annum may be saved by the adoption of a better system in the working of our ores.

WE regret to hear of the death of Prof. McGauley, connected with the *Scientific Review*, the organ of the Inventors' Institute, London. Professor McGauley resided for a time in Canada, and his friends there will regret to learn of his death.

IT is said that the only fruit which grows in every climate is the strawberry. It is the only fruit which somewhere on the earth is picked every day the year round.

THE NOVEMBER METEORS.

According to programme, the expected meteoric display came off early in the morning of the 14th inst., and so far as numbers are concerned, Prof. Loomis, of Yale College, pronounced the exhibition more remarkable than the one our European neighbors were favored with one year ago, and but little inferior to that seen in the United States in 1833. Reasoning from analogy in the case of the shower thirty-four years ago,—as we mentioned in our last issue,—astronomers confidently predicted this meteoric exhibition, and arrangements were made in most of our observatories for making systematic records of the shower. During the greater part of the night the task of mapping down on star charts the course and exact time of appearance of solitary meteors, was an easy one; but towards morning their appearance became so frequent that the observers ceased their efforts to time and map them, and only counted. The authority above quoted states that at New Haven the shower reached its greatest magnitude at 4.30 A. M., over five hundred being then counted by one observer in an hour. And as one individual can watch but about one-sixth of the hemisphere, according to the usual method of computation, 3000, at least, were at this time visible in the whole heavens, and without doubt, twice that number actually came within the field of vision, but were eclipsed by the superior light of the full moon. From all parts of the country, have come reports of the beauty and brilliancy of the shower. Even the inhabitants of our Pacific States witnessed it, although, of course, it reached its full grandeur at an hour much earlier than with us. The display was not visible in England, or on the Continent.

The time when the shower attained its greatest brilliancy was, in this section, two hours later than that given by European observers of last year, and next year the display, if there be any, will not begin until ten o'clock A. M., Washington time, and will, therefore, be seen only in the Pacific Ocean.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Foxdale mine in the Isle of Man, is already one of the richest lead and silver mines in Great Britain; but its value has been very much increased by the discovery of an ore hitherto unknown to exist in that country. The name of the ore is "Fahlerz" (tetrahedrite). It yields an immense amount of silver.

A steamer has left Havre, having on board a large number of French locomotives, consigned to Russia. The report that the Creusot works had received an order for eighty locomotives—a report which has been freely published by our exchanges—it appears is a little premature, the affair not as yet being definitely concluded. The pecuniary assistance proposed to be afforded by the Russian government this year, to the work of railway construction in that empire, is about $15,000,000.

White chrome ore is found in Hanover, near Gettysburg, Pa., which yields about 55 per cent of iron. This ore is of the same kind as is now shipped from Havre de Grace, to Sheffield Eng., to be used in the cutlery establishment of that place.

The first sleigh-bell ever made in this country was manufactured at Chatham, Conn., in 1780, and that town still retains a monopoly of this business.

In the city of Dresden, albumenized paper is manufactured at the rate of upwards of 6,000 reams per annum, a quantity that would suffice to print more than 120,000,000 *cartes de visite*. The whites of 2,000,000 eggs are annually consumed in preparing this paper the yolks of which, are used by tanners for preparing the finer kinds of leather. After preparation, the paper is carefully assorted, and from ten to fifteen per cent is rejected for photographic purposes but is used by Dresden printers for color printing.

The Inventors Manufacturing company established one year at Terryville, Conn., operate the largest shears and scissors factory in the country, and turned out last year about 60,000 dozen, worth from $600,000 to $700,000.

The "Lake Shore" railway lines between Buffalo, Cleveland and Toledo, are about to consolidate with the Michigan Southern on the one hand and with the New York Central on the other, thus placing the whole route under one board of management. If effected, this combination will represent some $150,000,000 of railroad capital.

At the head of Thunder Bay, on Lake Superior, two veins of native silver have been discovered; one seventeen the other eighteen feet in width, and one of them extending some three or four miles.

Jasper is now procured to almost any required extent at St. Gervaise, in Savoy. One quarry has a depth of 60 feet and a surface of at least 24,000 square yards.

The exports of iron and steel of British manufacture from the United Kingdom has undergone a wonderful expansion of late years. In 1847 these exports amounted to 530,000 tuns; in ten years this increased to 1,500,000 tuns. Comparing 1866 with 1847 there is an increase of no less than 206.38 per cent. Last year appears to have been the best twelve months on record in valuation of exportations.

The Spanish journals state that the small-arms manufactory at Placentia is working night and day, executing an order given by the French Government for muskets of the new pattern. A French agent is on the spot, and has offered a premium of 30 reals for each Chassepot delivered before the time stipulated.

The failure of the great house of Decoqueville, whose iron founderies are to be sold by public auction on the 30th inst., is traced to the fatal effect of the Paris Exposition on French trade.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

SELF-SETTING GAME TRAP.—Alfred Wilkin, McConnelsville, Ohio.—This invention has for its object to furnish an improved trap which shall be durable, cleanly, entirely free from the odor of animals, requiring little care to keep it in working order and capable of destroying large numbers of animals at one setting.

BOLT FASTENING.—V. Lapham, El Paso, Ill.—This invention has for its object to furnish an improved fastening for thill coupling bolts, clevis bolts, and other pivoting bolts which will hold the bolt securely in place and which can at the same time be easily and quickly attached and detached.

LAMP.—James Lee, New York city.—This invention has for its object to furnish an improved lamp so constructed and arranged as to guard against explosion by preventing the undue heating of the upper part of the oil reservoir and at the same time to guard against the lamp's being broken should it accidentally fall.

HAY RAKE AND TEDDER.—J. M. Law, Portlandville, N. Y.—This invention has for its object to furnish an improved attachment for hay rakes by means of which hay may be shaken out and stirred up or turned quickly, conveniently and thoroughly.

LEVELING ATTACHMENT FOR STEAM HARVESTERS, ETC.—Benjamin F. Cook, Olema, Cal.—This invention relates to a new and improved leveling attachment to be applied to steam harvesters and other agricultural implements which are mounted on wheels for the purpose of keeping the main frame in a horizontal position in its transverse section when the machine is passing over inclined ground. The invention consists in interposing between the back axle of the machine and the bolster above it a wheel having its rim beveled or made inclined and connected with a windlass or capstan in such a manner that the wheel may be turned with facility and the main frame of the machine brought to or retained in a horizontal position when the wheels on which the machine is mounted are passing over inclined surfaces.

HOISTING APPARATUS.—A. F. Crosman, Steamer *Ossipee*, North Pacific Squadron, U. S. Navy.—This invention is designed to facilitate the hoisting of small boats at the sides of ships and other vessels. The invention consists in a novel arrangement of the davit tackles whereby the tackle of both davits are operated and the boat hoisted or lowered by the manipulation of a single rope. The invention further consists in a novel means for releasing simultaneously both ends of the boat from the hooks of the tackle blocks when the boat is lowered so as to reach the water and thereby prevent the capsizing of the boat a contingency of not unfrequent occurrence when the water is rough.

DRYING ATTACHMENT FOR PAPER-RULING MACHINES.—R. J. Groshans, Buffalo, N. Y.—This invention consists in applying to paper-ruling machines a revolving fan in such a manner that the ink on the freshly ruled paper will be rapidly dried and the paper under the influence of the blast generated by the revolving fan be made to drop evenly into the box or receptacle prepared to receive it.

COMPOSITOR'S COPY HOLDER.—P. A. La France, Elmira, N. Y.—This invention relates to a new device for holding the manuscripts on printers' type cases and consists in the arrangement and construction of a platform which rests on suitable supports provided for that purpose on the type case and which can be easily moved laterally on the said type case to enable the compositor to reach all the types.

MACHINE FOR UPSETTING, CUTTING AND PUNCHING IRON.—J. J. Rose, Elmwood, Ill.—This invention has for its object to improve the construction of the machine patented by the same invention Aug. 1, 1865, and numbered 49,158.

BELT FASTENING.—David Wigger, New York city.—This invention relates to a new belt fastener which is so arranged as to be easily opened, and which, when closed, can be securely locked, and which is of great strength and durability.

FISHHOOK.—A. I. Lenhart, New Brunswick, N. J.—This invention relates to a new and improved fishhook of that class which are provided with a spring, a catch or fastening, and one or more supplemental hooks, which, when the fish seizes the bait, are released and spring so as to penetrate the fish and secure it. The invention consists in a novel construction of the device, or the arrangement of the parts, whereby the capture of the fish, when the latter nibbles or seizes the bait, is rendered almost certain.

BLEACHING PAPER STOCK.—S. T. Merrill, Beloit, Wis.—This invention has for its object the bleaching of paper stock in a more economical manner than hitherto, and consists in subjecting the stock to the action of chlorine gas while the former is undergoing the process of comminution in what is known as the "rag engine," or the stock agitated in a close vessel.

RAILWAY TRAVELING HOOK.—Wm. R. Oatley, Rochester, N. Y.—This invention relates to a new and improved hook by which travelers in railway cars may suspend any hand luggage from the hat racks over the seats. The invention consists in connecting two hooks together by a swivel joint, one hook being of sufficient dimensions to catch over a rail of the rack, and the other hook of such size that a strap, string, or cord may be readily suspended or fitted upon it.

COMBINED CHIMNEY AND VENTILATOR.—A. S. Whittemore, Willimantic, Conn.—This invention consists in combining a chimney or flue with a ventilator in such a manner that the compartments of a building may be thoroughly ventilated and the chimney or flue at the same time rendered perfectly fire proof.

PAPER RULING MACHINE.—Edmund A. Warren, Brooklyn, N. Y.—This invention relates to a new and improved machine for ruling paper, and it consists of a rotating cylinder provided with nippers to grasp and hold the sheets of paper to be ruled, and also provided with adjustable cams, the above parts being used in connection with a pen beam, and all constructed and arranged so as to operate in a perfect manner.

MOWER AND REAPER.—A. W. Tucker, Waxahachie, Texas.—This invention relates to a new mower and reaper, which is made adjustable so that the cutting apparatus can be set to a higher or lower level, and so that it can be thrown out of gear at pleasure; an endless apron is arranged directly in rear of the cutting apparatus, to receive the cut straw or grass, which can be discharged from the apron either in continuous succession or in swaths at suitable intervals.

PUNCHING MACHINE.—Morris Seiferth, Morristown, N. J.—This invention relates to a new punching machine, for perforating plates or for stamping or notching the same, and consists in the use of an automatic cleaner, by which the plate, after a hole or depression has been punched, is lifted off the lower stationary punch, so that it can be easily adjusted upon the same, for the punching of the next hole or mark, while the die is moved up by the cam of the driving shaft.

HOUSE VENTILATOR.—Robert Boyd, Evansville, Ind.—This invention relates to an improved method of ventilating dwelling houses, halls, hospitals, and public buildings, whereby the fresh air from the outside may be conveyed inside, and the vitiated or foul air escape therefrom.

BRIDLE BIT.—A. H. Rockwell, Harpersville, N. Y.—This invention relates to a new bridle bit, which is an improvement on the ordinary four-ring bit, and which has on a flexible mouth piece two sliding bars, which are connected with a nose strap or face piece, in such a manner that by pulling the reins the said bars will be forced together, thereby pressing with great force against both sides of the upper jaw of the horse.

VACUUM AIR ENGINE.—J. R. Cameron, Pittsburgh, Pa.—The object of this invention is to form a vacuum by the expansion of air by heat, and by other appliances, by which the piston of a working cylinder may be driven by the simple pressure of the atmosphere, and power obtained thereby for driving machinery or other purposes.

SCREW DRIVER.—T. D. Voorhees, Easton, Pa.—This invention consists in making a portion of the ordinary screw driver just below the handle of a round form, and placing upon it a loose ferrule or thimble.

ROTARY STEAM ENGINE.—Edwin Chapman, Rochester, Minn.—This invention relates to a certain useful improvement in the class of steam engines known as rotary engines, and it consists principally in the manner in which the abutments are operated, and in the manner in which the steam is discharged with the cylinder, and exhausted therefrom.

CHEESE PRESS.—E. J. Crane, La Porte, Ind.—This invention relates to a new and improved method of constructing cheese presses, whereby the same are made self-acting, and the invention consists in arranging two levers with suitable supports in such a manner that the cheese presses itself when properly arranged upon its table.

COMBINED SCHOOL DESK AND SEAT.—J. P. Scott, Lewisburg, Pa.—This invention relates to an improvement in the construction of a school desk, combined with a seat, and consists in such an arrangement and combination of parts that the seat and the desk may be separately adjusted in hight to suit pupils of different sizes, and that the seat and a lid of the desk may be folded up when not in use, and to be compact and out of the way when desired.

MACHINE FOR CUTTING PAPER STOCK.—Abijah L. Knight, Baltimore, Md.—In this invention the rags are fed to a vertically cutting knife, by means of a combination of smooth and fluted rollers, to which an intermittent motion is imparted.

CAR AXLE.—Samuel S. Burt, Marquette, Mich.—In this invention the axle boxes are fixed to a stout iron yoke, the ends of which pass over the wheels. Each wheel runs on a short axle, independently of all the others.

GOLD SEPARATOR.—Wm. C. Stiles, Nevada City, Cal.—This invention is an improved instrument for panning or separating gold from earth. It consists of an inclined vibrating table, having a series of panning, screens, and counter inclines, arranged along its surface, and operating in connection with gentle streams of water fed to it from different points above it.

LATCH FOR GATES, ETC.—Mark J. Bria, Oxford, Ind.—This invention consists in a novel arrangement of a lever latch for gates, etc., whereby a person may open the gate from either side, without reaching over the top of the same.

LATCH FOR DOORS, ETC.—Edward King, Taunton, Mass.—This invention consists in a novel connection between the latch and handle, or knob spindle, whereby the action of the latch is made free and certain, and the same are rendered more durable.

SKATE.—George W. Shearer, Crown Point Center, N. Y.—This invention consists in a novel manner of connecting the runner or blade to the foot rest or block of the skate, through an arrangement of springs and levers, whereby an easy and elastic movement is imparted to the skater, and also of so grooving the under surface of the runner as to combine all the advantages of both a plain and grooved runner.

HAND DICE BOX.—Justus E. Zender, New York city.—This invention consists in making a hand dice box of metal, and of lining any hand dice box with felt cloth or its equivalent, whereby the same are made stronger and more durable, and whereby the noise occasioned by the shaking of dice is partly diminished, or prevented altogether.

DEVICE FOR SUPPORTING AND FASTENING WINDOW SASHES.—Amos Cutter, East Boston, Mass.—This invention consists in an attachment for the sash or window frame, so as to be susceptible of being brought against the window or sash frame, as the case may be, with a greater or less amount of force, by the simple turning in or out of a thumb screw, or its equivalent.

VALISE OR TRAVELING BAG.—N. Grocl, Newark, N. J.—This invention consists in an application to the corners of the leather constituting the sides of the bag or valise, of metallic corner pieces, in such a manner as to partly stiffen and strengthen the same, and thus to increase their wear and durability.

TAG HOLDER.—A. Grushus, St. Paul, Minn.—This invention consists of a holder made of spring wire, in a peculiar shape, whereby a tag may be fastened to and detached from the cloth, or other material, with great facility.

ADJUSTABLE WATCH KEY.—J. S. Birch, New York city.—This invention has for its object to furnish an improved key for watches, which may be so adjusted as to fit any watch, whether large or small.

ATTACHMENT FOR DOORS.—C. J. Fisher, Waukon, Iowa.—This invention has for its object to furnish an improved attachment for doors, which will prevent the knob or latch from injuring the wall, which will hold the door securely in any position to which it may be opened, and which will also securely fasten the door when closed.

SASH FASTENER.—George Brosius, Bausch's Gap, Pa.—This invention relates to an improvement in sash fasteners. The breaking of window weight cords, the difficulty and annoyance of putting in new, and the rattling of the guillotine window, have stimulated the invention of various devices dispensing with the sash weights and providing for the locking of the sash, and to this class of devices the present invention belongs.

SELF ACTING SLEIGH BRAKE.—C. Gardiner, Esperance, N. Y.—This invention relates to a self-acting sleigh brake, and consists of a cross bar carrying two bent levers, one on each side of the sleigh; hinged in each lever is a pawl, which catches on the ice or snow when the cross bar is forced back. The bar is operated by means of a connecting rod, secured to a sliding on the tongue or pole, and fastened to the neck-yoke pin, or attached in some other suitable manner.

SHEEP TROUGH.—Frank Ketcham, Monongahela City, Pa.—This invention relates to an improved sheep through, and consists in a reversible trough so constructed that one trough is always dry and clean.

RAILROAD SUPERSTRUCTURE.—J. A. Maxwell, Savannah, Ga.—This invention relates to an improvement in railroad superstructure, and consists in a combination of the cross-tie and stringer systems of laying the rails, whereby the advantages of both are secured.

TOBACCO PRESS.—T. N. Reed, Danville, Va.—This invention relates to an improved tobacco press. It consists of a box of iron, or some other suitable material, in which are two false sides, or boards, movable within the box frame in the direction of a line at right angles to their planes.

QUILTING FRAME AND CLOTHES HORSE.—G. A. Mallory and J. J. Fish, Oxford, N. Y.—The nature of this invention consists in constructing a frame so arranged as to be adapted equally to use as a quilting frame and a clothes horse, and capable of adjustment for either purpose, as desired.

CARPENTER'S SQUARE.—O. H. P. Robinson, Belfast, N. Y.—The object of this invention is to enable carpenters and builders to lay out the mortises in framing houses with dispatch and accuracy. It consists in making a slot in the main bar of the square, for scribing the mortise directly within it, instead of measuring and scribing on the outer side of the square, in the ordinary manner.

YOKE FOR GRAIN ELEVATOR.—Eliza Jane Jewell, Brooklyn, N. Y.—This invention relates to a new manner of constructing and arranging the sliding yoke of a grain elevator, and consists, first, in making the yoke of cast iron instead of wood, as has heretofore always been done; and second, in the use of adjustable guides between the yoke and the wooden frame, whereby unequalities arising from the expansion or construction of the frame or yoke, or either, can be regulated.

PUNCH AND SHEARS.—J. C. Jordan, Watertown, Wis.—This invention relates to a machine wherein sheet iron and other metals can be cut or punched, as may be desired, and the invention consists in so shaping the main lever of the machine that it will at the same time force down a punch, by a cam, and operate the shears, one of the blades of which is secured to the said lever.

STRAW CUTTER.—Hiram Parks, Athens, N. Y.—This invention relates to a straw cutter in which a curved knife is used, and is secured to a revolving shaft, so as to make a drawing cut, and so as to cut a whole bundle of straw with the same facility with which the usual machines cut a small quantity.

BLACKING BRUSH.—Chas. A. Paret, Nashville, Tennessee.—This invention relates to an improved blacking brush and consists in passing an endless elastic band crosswise through four staples upon the back of the brush stock to hold the box of blacking and in a groove along the side of the stock to receive a scraper.

MACHINE FOR SHAPING AND PRESSING HOODS.—Solomon and Henry Squire, Monson, Mass.—This invention relates to a machine for shaping and pressing hoods and consists of hollow metal block of the required shape into which a heater is inserted or the same may be heated by a gas jet or lamp. This block is hinged upon a stand midway between two uprights which work in grooves in the side of the frame and are surmounted by a yoke piece supported by springs a jointed presser is suspended loosely from the center of the yoke by an adjustable suspension rod and metal lip overlapping the plates.

CULTIVATOR.—M. Barnett and Eli Wood, Hardinsburg, Ind.—This invention has for its object to furnish an improved cultivator, so constructed and arranged as to run lighter, be more durable, and less liable to get out of order than the cultivators now in common use.

WASHING MACHINE.—Allan Neilson, Allegheny City, Pa.—This invention relates to a washing machine in which two or more corrugated conical rollers, which are secured in such a manner in a swinging frame above a flexible washboard, that their axes cross each other, while their under surfaces are with their whole length on the said board, so that by oscillating the said frame, the rollers will rotate on their larger diameter and slip on their smaller end, and will thus at once beat and rub the clothes to be washed.

FRICTION CLUTCH AND PULLEY.—C. D. Palmite, Oswego, N. Y.—This invention consists in the employment of a pulley fitting loosely upon a shaft, and driven by a belt from any suitable power, in combination with an elbow-shapen friction lever, may, by the said wedge, be pressed against the inner circumference of the pulley rim, thereby connecting the pulley with the sleeve and shaft, and driving the latter.

EXCAVATOR OR DITCHING MACHINE.—Isaac V. Adair, Varick, N. Y.—This invention has for its object to furnish an improved machine designed especially for use in removing the earth from ditches after it has been loosened by a ditching plow.

PENCIL HOLDING ATTACHMENT FOR CARPENTERS COMPASSES.—W. G. Hillegass, Philadelphia, Pa.—This invention relates to a device by which carpenters steel pointed compasses can be provided with a pencil point, whenever desired so that the said pencil can be applied in a convenient manner; while heretofore the pencil had to be tied to one of the legs of the compass by means of a thread or string.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

G. A. D., of Me.—"How can stains be removed from soap stone and the polish renewed?" It depends on the nature of the stains. If grease, soap will remove them.

R. R., of Canada.—"Do you know of a cheap composition to coat glass for making mirrors; I have heard of such a thing being used in Europe?" We know of no process or material cheaper than those usually employed.

J. K. B., of Canada, desires to know the value of "magnetic or black sand," large deposits of which have been discovered near his place of residence. In reply we would state that the black sand ore is in high repute for facility of reduction. The ore in the United States varies so greatly in quality that its mining is attended with uncertainty.

L. A. L., of ——.—"Is there any fluid or solid substance through which a magnet will not attract?" None known.

S. A. G., of Ind., wants to know what glistens in the small bits of stone he has sent us. It is mica, utterly valueless except when found in large masses. He asks, also, what to put in his plating solution to make the gold or silver deposit bright. You cannot deposit blacking on your boots and have it bright without brushing or burnishing; neither can you deposit metals by the galvanic battery and have the coating bright without burnishing.

H. C., of Mass.—The "skivers" or knives used by curriers in dressing the flesh side of skins have no edge similar to that of an ordinary cutting tool. The edge is quite "slant," or of a short bevel, and the feather edge is turned by a "steel"—a round spindle—so that it forms an angle with the blade of nearly if not quite 180°. There is much art and experience required in its use.

P. McC., of N. J., says that mill picks should not be drawn at the edge, but should be forged thick and drawn back of the edge, the cutting portion being left as hard as water can make it.

F. G. W., of Mass., asks several questions relative to steam engine vacuums, condensation, pressure of the atmosphere, etc., all of which can be more readily answered by a treatise on natural philosophy or the life of James Watt than through these columns. We respectfully refer him to elementary works on steam engines.

A. F. F., of Ill., asks if he can construct an annealing furnace for sheet brass and do the work properly by means of an endless grate, or a grate attached to an endless apron. We see no reason why the plan is not practicable.

J. J. N., of Pa., asks for a rule to set the heads of a lathe when it is designed to turn a taper, the length of shaft and degree of taper being given. He offers for an example a piece one foot long the taper to be half an inch; "how far should I set the head from the taper line?" If the taper is to reach from end to end of the shaft the head should be set over just one quarter of an inch, in all cases one half of the taper required. But it may be he makes no allowance for the space taken up by the dog. We know of no absolute rule perfect under all circumstances. The experienced eye is the best rule for ever varying cases, always keeping in view that for every quarter inch the tail is thrown over double the taper is given, etc.

J. V., of Ala., sends a diagram and description of a flying machine which he thinks will work, and asks us to publish it. We prefer to wait until we receive some account of a machine actually at work. We have piles of these suggestive and conjectural letters on aerial navigation, not one of which seems to us at all practical.

A. G., of Fla., replies to J. H. S., of O., that he can harden his cultivator plow without springing by chalking it well upon both sides, heating it to a cherry red and dipping it gradually into water.

E. B. Y., of Pa., asks "what acid or other substance will separate the carbon from carbonic acid or carbonic oxide so as to leave the oxygen only?" The information, if we could give it, would be acceptable not only to E. B. Y., but to the scientific world at large. We regret that we share in the universal ignorance of any means of accomplishing this end.

F. R., of N. Y., propounds a series of questions to which we reply: 1st; The article sold by druggists under the name of benzine is derived from petroleum, and is identical with naptha. 2d; Common petroleum or burning oil is better than benzine for preserving sodium. 3d; Napthaline is a solid camphor-like substance, found in gas tar. Gasoline is one of the most volatile liquid products of petroleum. 4th; Albumen is preserved on a large scale by drying. 5th; The atomic weight of oxygen is 16; the equivalent is 8. 6th; "Maynooth's iron battery" has not come into use. The inference you may draw is that its merits have been over stated. 7th Fresenius' Anaylysis and Miller's Chemistry are among the best authorities on chemistry.

E. C., of N. Y., referring to the instance given in our issue of the 16th inst of a piece of wood having imprinted itself upon a bar of iron states that he noticed recently in Fitchburg, Mass., a granite boulder, upon which was a representation of the bottom or end of a post which had been standing upon it for a number of years, the impression being about one-sixteenth of an inch deep. He calls upon some correspondent for a satisfactory explanation of this singular fact.

"Inquirer" calls for some table giving the percentage of alcohol in the various liquors, wines and brandies, more reliable than that of Brande, which is usually found in the books? Any such table can be only correct for particular samples, the percentage varying with the honesty of the distiller and age of the liquor. We refer Inquirer to an exhaustive article on alcohol in Muspratt's Chemistry.

B. F. E., of Ohio, replies to the inquiry of F. K., of Mo., for a simple recipe for softening hard water "that one quart of bran confined in a bag and boiled in ten gallons of hard water will bring the lime to the top which can then be skimmed off." This plan, he asserts, is superior to using sal-soda or wood ashes and is just the thing F. K. wants.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

NEW PUBLICATIONS.

ASTRONOMY. An Elementary Work on Physics, by W. T. Rolfe and J. A. Gillet, both teachers in the High School at Cambridge, Mass. Boston: Crosby & Ainsworth, New York: O. S. Felt.

The authors show how we know the earth rotates on its axis; that the earth and planets with their satellites revolve in elliptical orbits about the sun; and that the sun and the stars are moving through space, or about other stars. They have also endeavored to show how, by measuring a line a few miles in length on the surface of the earth, and a few angles, we are able to find the size of the earth, and to pass out into space and measure the distance from the earth to the sun, from the sun to the planets, and from the earth to the fixed stars—a distance so vast that the velocity of light is the only unit suitable for expressing it.

ELEMENTS OF NATURAL PHILOSOPHY. By the same authors and publishers as above.

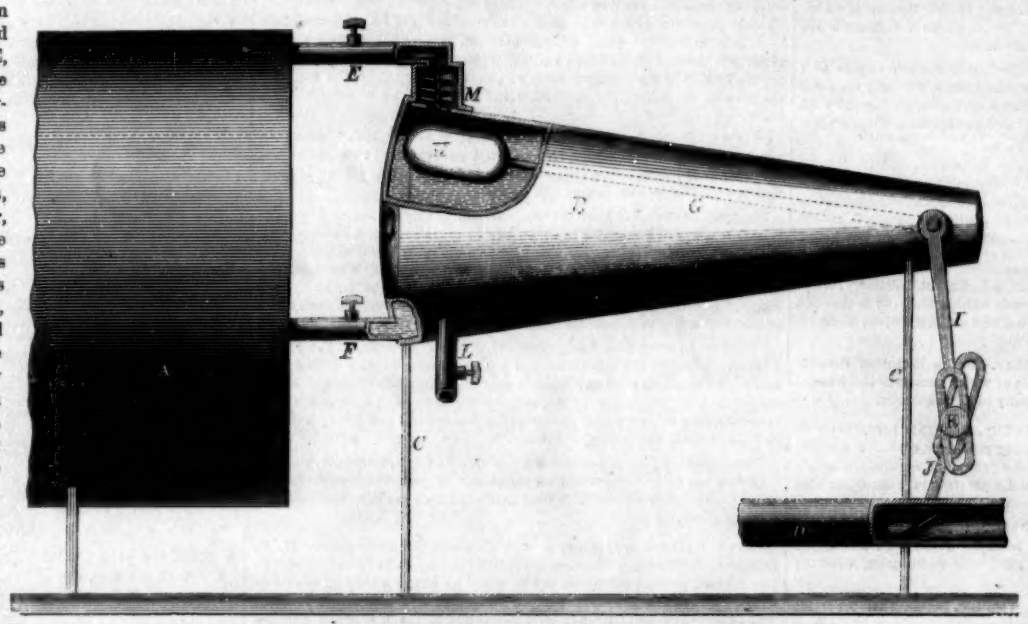
This work is designed as a first book in physics, to be used in grammar and district schools. The work consists of three sections: the first treating o pressure; the second of motion; and the third of machines and sources o mechanical power. Under the latter are taken up the so-called "mechanica powers," and the sources of mechanical power—namely, hand power, horse power wind power water power, and steam power; and an account is given of the most important machines by which each of these is made to do work. Under water power are included the subjects usually put under hydraulics. This work, as well as the work on Astronomy, is profusely illustrated.

EXTENSION NOTICES.

Samuel G. Lewis, of Kellyville, Pa., having petitioned for the extension of a patent granted to him the 14th day of February, 1854, and reissued the 23d day of October, 1867, for an improvement in making thick paper, for seven years from the expiration of said patent, which takes place on the 14th day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day January next.

Device for Regulating the Amount of Water fed to a Boiler.

Not a few of the boiler explosions that occur are directly attributable to lowness of water, and often this state of water cannot be detected by the gage, on account of some fault either of construction or operation. Under such circumstances an automatic, absolute, and reliable device for regulating the amount of water fed to the boiler is a desideratum. The inventor of the device shown in the accompanying engraving is confident that this is what is needed. A is the boiler to which is connected the water reservoir, B, which is a cone-shaped vessel supported by the standards, C. The water is fed into this reservoir by the pipe, D, and to all intents and purposes the reservoir is a portion or extension of the boiler, being connected with the steam space—seen above the dotted water line in A—by the pipe, E, and with the water space by the pipe, F, both of which are furnished with cocks. Inside this reservoir is a lever shown by the dotted lines, G, having at the large end of the cylinder a float, H, which rests upon the water, and is secured to a transverse shaft at the other end which has keyed to it the arm, I, that is slotted, as is also the valve arm, J, and both are connected and adjusted by a bolt, K. In the pipe, D, is a valve worked by the float, H, through the medium of these arms, I and J. L is a waste pipe with cock for drawing off the water when desired. The dome, M, attached to the steam pipe, E, contains a coil of copper wire intended by the inventor for the purpose of preventing incrustation in the reservoir.



JORDAN'S STEAM BOILER REGULATOR.

The operation is apparent. As the water lowers in the boiler the float, which rests on its surface, descends, opens the valve in the feed pipe, D, and permits a greater inflow of water from the pump, while the contrary result occurs when the water rises. Of course, if the accuracy of the apparatus is at all to be depended upon, this is a perfect regulator of the water in a boiler. The inventor also introduces in the lower end of his pipe a ball valve, which, when the pump is attached to the reservoir into which the hot water or condensed steam passes, prevents all the thumping experienced when pumping hot water.

This device was patented Sept. 24, 1867, through the Scientific American Patent Agency by R. J. Jordan, assignor to himself and E. Darling, of Elkhart, Ind. Address for particulars the former at Elkhart, Ind., Box 264.

Public Improvements in Paris.

Mr. Wales, in a recent, private letter, thus speaks of the progress in public and private improvements now going forward in Paris:—

"A new cattle market has just been opened in the outskirts of Paris, which covers a space of nearly three-fourths of a mile square. It is solidly built in dressed, cream-colored stone, and enclosed by strong walls, with a very handsome entrance. Every accommodation that modern experience has suggested is provided,—offices, fountains, water for the cattle, stalls, pens, and storehouses. A railway connects with the circular one that runs around the city, so that cattle from any point in France can be brought straight in without transhipment. The whole space is covered by a roof, but open at the sides. From 5000 to 6000 cattle, 20,000 sheep, 2500 calves, and as many pigs, can easily be accommodated. A communication by bridges connects the market with the new slaughter houses on the opposite side of a canal. No animals for slaughter are ever seen in the streets of Paris, and the streets are always kept perfectly clean. The SCIENTIFIC AMERICAN recently published an elaborate account of the Paris markets, which certainly surpass those of any other city in the world. The municipal government exercises the most rigid inspection over every article exposed for sale, and no poor, half decayed meat or vegetables are allowed to be sold or offered for sale.

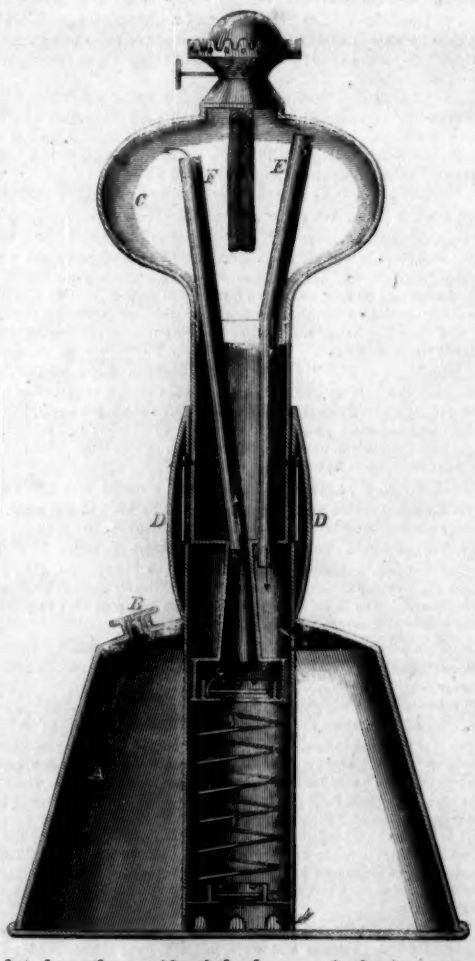
"Nothing in Paris so much impresses an American as its splendid public buildings, and the perfect order that prevails in its busy thoroughfares. At this moment a new opera house is nearly completed, which is the most elegant building of the kind in the world. It will cost forty million francs, the expense being equally divided between the Imperial Government and the municipality of Paris. It is also a great mistake to assert, as many do, that the private residences of New York are finer than those in Paris. During the ten years past Paris has improved wonderfully in this respect, so that now she outrivals all other modern cities. I wish the authorities in New York could be induced to copy some things which are so valuable to the people of Paris."

Antiseptic Properties of the Sulphites.

At the recent Dundee meeting of the British Association Dr. Polli communicated a paper bearing on this subject containing facts which he had obtained as the results of extended observations. Sulphurous acid was said to be the most active agent in preventing or arresting all organic fermentation. As the acid, however, was not sufficiently applicable in experiment, Dr. Polli had undertaken an investigation as to the action of the sulphites of lime, hyposulphite of magnesia, sulphate of magnesia, sulphide of soda, and granulated sulphite. These substances were found to possess all the properties of sulphurous acid, with the advantage that their action was more uniform and certain and constant. In experimenting on animals and himself, he found that large doses could be taken without risk. On killing animals treated with sulphites, and others not so treated, he found that the former were most slow to decompose, and, indeed, remained quite fresh when the others were putrescent and offensive. Another series of experiments showed that in one class the administration of the sulphites, was sufficient to effect a more or less rapid cure in cases where blood poisoning was present, as in fevers, but this fact he did not attribute to any curative power in the sulphites, but to the fact that they arrested decomposition, and by so doing allowed the animal to recover by the recuperative power existing in its own constitution. The author thought his observations conclusive as to the excellent influence of the sulphites on the septic diseases, and remarked that it was for the purpose of thus benefitting others that he had brought his researches under the attention of the scientific world.

HOFFMANN'S IMPROVEMENT IN LAMPS.

The intention of the inventor of this lamp is to construct one not liable to explosion if kerosene or similar fluids are



used, to keep the outside of the lamp perfectly clean, to save much of the labor of filling and trimming, and to prevent the evaporation of the oil by heating. It may be constructed either of metal or glass. A is the oil reservoir, the oil being poured in at the cap, B. Into this reservoir is fixed a tube which supports the lamp or wick holder, C. This is also secured upright by the braces, D. From the upper vessel descend two tubes, E and F, one of which, E, returns any excess of oil in the upper vessel back to the reservoir, and the other, F, leads the oil up into this wick holder. The spiral spring in A sustains the upper cup in position. In the tube are two loose valves, G and H, held to the seats by transverse bars or snugs, and packed with rubber. The apertures seen under H permit the oil to flow into the lower part of the tube. From these references to the engraving—which, it will be noticed, is sectional—it will be seen that the internal details form a pump. By pressing down the upper vessel, the valves, G and H, are worked, and the oil in the reservoir is forced up through the tube, F, to feed the wick. Before this vessel can fill, the oil will flow over into the pipe, E, and pass back in the direction indicated by the arrows, to the reservoir.

By these arrangements the oil, being so far removed from the flame of the lamp, can never become heated, thus preventing the generation of gas from the oil; not a particle of oil can escape from the inside of the lamp to soil the outside, and all danger of explosion from the communication of the flame to the oil is avoided.

The arrows in the engraving show plainly the course of the oil from the reservoir to the upper vessel, and its return, if too much is pumped up. By a change in the wick tube any burning oils or fluids may be used in this lamp. The lamp, or the oil reservoir may be filled while the lamp is lighted without danger, and it is believed that this separation of the lamp proper from the oil reservoir will entirely prevent explosions.

Patent papers for this invention were obtained through the Scientific American Patent Agency, Oct. 1, 1867, by Peter Hoffmann; who desires to sell rights to vend and manufacture.

Makers of lamps, and others interested, will please address him at Constableville, Lewis county, N. Y.

Machine for Extracting Tannin from Hemlock Bark.

Mr. Langley, at the November meeting of the Massachusetts Institute of Technology, described a machine for the above purpose, now in process of construction at the South Boston Iron Works, under his superintendence, and from his designs. By this machine much time and labor will be saved, and the old tedious process of long contact of the coarsely ground bark with the skins to be tanned considerably shortened.

The hemlock bark, in pieces of half an inch to an inch thick, and several inches long, is soaked for about fifteen minutes in water at 200° Fah.; it is then fed into a hopper, which conducts it to a three-rolled machine, something like the rollers of a sugar or cane mill, through which it passes, coming out lacerated and compressed: it then falls into a vat of hot water, where it is agitated by a wheel, that the tannin from the crushed cells may be dissolved in the water; it is then raised by a series of buckets on an endless chain, somewhat in the manner of a grain elevator, to another hopper, whence it is fed to another series of three rollers; here it receives its final compression, and comes out in flakes or sheets, like coarse paper, and almost free from tannin. The buckets are made of coarse wire, that the water may drip through during the elevation. In order to avoid the blackening action of iron, wherever this metal is brought into contact with the solutions, it is thickly coated with zinc.

The extracts thus obtained are of a fine crimson color, highly concentrated—indeed almost saturated solutions of tannin; they require to be largely diluted, being from three to six times too strong for application to the skins; thus the tanning principle of a cord of bark, which the machine can treat in an hour, is concentrated into a barrel of the extract. Even supposing that the tanning process cannot be shortened, as far as the best quality of leather is concerned, any one will see the immense advantage of taking a machine to the hemlock woods, and bringing back tanning extract by the barrel instead of so many loads of bark. This process will open an immense and profitable commerce between this country and others where tanning materials are not indigenous.

The Spread Locomotive Truck.

In No. 17, current volume, page 263, a reply to J. P. J., of Pa., states that the locomotive truck was invented in 1831, and that Wm. Mason, of Taunton, the well known inventor and manufacturer, improved it by spreading the wheels to admit of the use of a cylinder on a level with the center of the driving wheels. This referred to outside cylinders, of course.

A correspondent from Massachusetts states that he was in the employment of Mr. Mason when he delivered his first engine, and that previously he had superintended the construction of spread truck locomotives in another establishment.

We knew only that the Mason engines achieved a deservedly wide-spread popularity mainly for this and possibly for other minor improvements, and had always supposed he was the first builder to spread the truck sufficiently to allow of the cylinders on an "outside" engine to be leveled to the centers of the drivers. The statement of our correspondent, however, is conclusive on this point. To whomsoever it may be accredited it was a long step in the right direction.

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VOL. XVII., No. 22....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, NOVEMBER 30, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

HAND-TOOLING---ITS ADVANTAGES TO THE MACHINIST.

With the improvement in automatic or self-acting tools the acquirement of skill in manipulation has not preserved the importance to which it is justly entitled. The hand tool for turning does not preserve the high position which it formerly occupied, yet its use is exceeding valuable, and even necessary, in many instances. There is an extensive class of work in machine building on which it can be advantageously employed; yet we are not aware that in this country its use is generally taught as a part of the apprentice's education. It ranks next in importance to the file, and a machinist who can handle it with facility is always an important hand in a shop.

Curved and irregular forms, which must be turned, may be finished much more readily by the hand tool, if judiciously and properly used, than by the fixed lathe tool. For instance, common iron washers, which are placed under the head of a screw or a nut, may be turned and water polished by the hand tool very rapidly. We can hardly imagine any other method of finishing them. The washer is driven on an arbor with just sufficient force to retain it in place, then the arbor put upon the lathe centers, with a dog to engage with the face plate, and revolved as rapidly as a drill—almost as rapidly as a piece of wood to be turned. A diamond pointed tool, made from a triangular file, will speedily remove the scale, when another tool, used with water, will give a splendid finish, the washer so treated presenting an elegant appearance. So in "skinning" or lightly turning a small shaft or arbor the hand tool is invaluable; and in finishing out curves and bevels on a shaft.

The formers for brass musical instruments, which taper for much of their length and then expand by a gradual but varying curve into the "bell" can be more easily and rapidly finished to the gage by the hand tool than by any automatic lathe however perfect and complicated.

The heads of steam engine cylinders are often beaded and ornamented by projecting rings. No ordinary engine lathe with its fixed tool, however handy the operator, can so rapidly and elegantly finish these ornaments as the hand tooler with his simple implements. So in hundreds of cases a practical knowledge of the hand tool is an immense advantage to the workman and profit to his employer.

Sometimes it is necessary to "chase" a screw thread instead of finishing it with the ordinary tool in a screw lathe. By the use of the chaser—which is but a modification or another application of the common hand tool—a screw thread can be finely finished and all its irregularities and roughness removed. Screws of odd sizes may thus be cut which would otherwise perhaps require dies made for that special purpose and occasion.

Skill in the use of the hand tool can be easily acquired; judgment and discretion are as necessary to its successful use as practice. The tools required are cheaply and easily made; the small tools being formed either from old files or bars of steel, and the shoulder tool being merely a stock of wood with a handle transversely attached, and carrying in a groove a straight steel bar properly shaped at the point and held by a screw. Machinists of foreign education at present excel in this specialty, but there is no reason why our American mechanics should not become adepts in hand tooling.

ECONOMY IN COKE MAKING---THE UTILIZATION OF THE WASTE GASES.

The only use that has heretofore been made of the gases driven off from bituminous coal during the prcess of coking has been to supply the heat necessary to make the coke. It will require but a glance to show that even with a coal with but a small proportion of gaseous matter in its composition, only a portion of its gas is really necessary to give the heat required to completely perform the operation of coking. The only attempt that we are aware of that has been made to utilize all the gases driven off is by the process of Messrs. Carver & Co., of St. Entienne, in France, and they issued a small pamphlet which was given to visitors to the show of articles made from the gases driven off in coking exhibited by the *Société de Carbonization de la Loire* in the Paris Exhibition. This pamphlet was explanatory of their process which is eminently successful. The gases from the coking coal are collected and drawn off through pipes, and cooled sufficiently to condense the tar, ammonical liquids, etc., contained in them; this purifies the gas and it can be used for the same purposes as that made by the ordinary illuminating gas works. From the tar and liquids thus condensed, benzine, napthaline, sulphate of ammonia, a number of artificial manures, and a number of dye stuffs, are made: fabrics are also exhibited colored by these dyes. All these valuable products are, therefore, made from the gases which are permitted to be wasted by the usual process.

This company estimate that the profit they net from these substances is 2½ francs for each tun of coal coked. And to give an accurate estimate of the profits which accrue from this source it is only necessary to say that the coking ovens of the company, and which have been in operation for over nine years, use annually upward of 80,000 tuns of coal in making coke. The pamphlet of Messrs. Carver & Co. contains a calculation that some three and a half million tuns of coke are made annually in France; this amount corresponds to some four millions of tuns of coal, a large portion of the volatile constituents of which are wasted and from this it is estimated that between twelve and thirteen million of francs are lost annually by the ordinary wasteful method. On the whole this is one of the most eminently successful examples of the application of practical chemistry to the arts that we have had the pleasure to record. It is a striking example of the benefits of the technical and industrial education which has been followed for many years in France, and indeed on the continent generally. We trust that before many years our practical men may enjoy equal advantages with respect to the application of theory to practical operations connected with the industrial arts not only as regards chemistry alone but in all other branches. To effect this we must have schools of a decidedly practical nature, and text books devoid of speculation and so clearly composed that the facts that they are written to convey may be clear to the average understanding of those seeking instruction from them. A traveller in Europe with any mechanical perceptions, cannot fail to be impressed with the importance of the continental system of technical instruction by the superb engineering and the wonderfully perfect metallurgic operations to be seen on every side.

THE PETROLEUM FUEL---WILL IT SUPERSEDE COAL?

The petroleum excitement reached its climax immediately after the trials with the retort apparatus on the U. S. S. *Palos*, in Boston Harbor. The results after these experiments were proclaimed on all sides as eminently successful; "the days of coal were numbered," so said one of the experts at a Babylonian banquet given in Boston in honor of "the great event of the age." A commodore in the U. S. Navy was so impressed with these trials that he forthwith petitioned the Department to order an extended trial at sea. There is a point in connection with the *Palos* matter that should not be committed, and that is that the report of the Board of Naval engineers, who were ordered to attend the trials and to strictly investigate them, has not, to our knowledge, been made public. It would seem that if this report was a favorable one, it would have been placed before the public long ago, and that too in a very conspicuous manner; if this had been the case it is pretty clear that it would have carried much more weight, and would also have influenced stock subscriptions to an extent considerably greater than the parade of the after-dinner speeches of the *savans*, sailors, and engineers who made an excursion on the *Palos* in Boston Harbor.

Since this event in the petroleum world the excitement has been gradually subsiding and the dying embers are only kept at a dull-red heat by skillful letter-writing by the correspondents of the New York press, in other cities. The Cunard line have not adopted it, neither is it used on railroads and it would seem that if the petroleum companies themselves have any confidence in the wares they are trying to persuade the public to buy, they would be introduced practically so that there might be a fair comparison with coal, particularly as it is claimed by them that the apparatus can be put in any furnace with very little labor.

The Dental Vulcanite Question.

We recently published a judicial decision in the vulcanite question which was adverse to the dentists. A meeting of dentists was held at Cincinnati, on the 7th inst., to take into consideration the dental vulcanite question, and the following resolution was adopted:

Resolved, That we approve of the action of the executive committee and all they who have been active for the dental profession of the West, in contesting the claims of the Goodyear Dental Vulcanic Company against the profession, and that we request them to continue the defense to the ultimatum, believing, notwithstanding the decision of Judge Wilson, of New York, that the importance of the subject demands full and final investigation by the best tribunal in the country.

ANTI-FRICTION METAL FOR RAILWAY AXLES.

Nothing interferes more with the success of mechanical inventors than the element of friction. Not even the law of gravitation offers such obstacles to the intentions of inventors. To overcome the resistance of friction, especially on shaft journals, there have been devised several combinations of different metals which together should give the greatest resistance to pressure and heat. One of the most notable successes in this line has been that of the well-known Babbitt metal, which even now holds a high place in the estimation of mechanics.

But, it is claimed that there are compositions which far surpass this in the points which are sought to be obtained. There is reason for this claim in the case of one, at least, and we are doing but an act of simple justice to call the attention of our railway men to the advantages of the "Star Metal," which is manufactured largely by the Star Metal Company at their establishment in Brooklyn, N. Y., and Chicago, Ill.

We lately visited the former concern and witnessed the various processes of manufacture, except the actual mixing of the metals, which is preserved a profound secret. The basis, however, of the Star metal is spelter or zinc. In this foundery are employed, at present, seventeen furnaces, in constant operation. The patterns are molded in ordinary furnace sand in iron flasks. The metal box is held in a shell of brass, as by experience it was found preferable to a box made entirely of the Star metal. The metal is run into the brass shell, with which it is united by partial fusion. The box is then cleaned and dressed to exact size by the file. The bearing is trued and polished by vulcanite emery rollers which form the half circle to a gage so that the bearings are as perfect as they could be made by boring or turning. The use of emery for this purpose will prove at once to the practical mechanic that this metal differs greatly from Babbitt, which if ground with emery would become filled with the flinty particles. The metal is, in reality, very hard, instead of being soft, and is so brittle that it does not clog the file any more than iron and much less than hard brass. This quality of hardness may seem to be an objection, as it is commonly believed that bearing metal should be soft, but the manufacturers claim that this very quality is one of the peculiar advantages of the metal. Its resistance to heat is remarkable, its melting point being but a trifle lower than that of ordinary brass, and it is very difficult to heat it by friction. It will not cut the journal when hot, as brass does, and it will outwear either brass or the Babbitt composition.

These boxes are in use on a large number of our most extensive railroads in the country, and have received in all cases the most unqualified commendation. The company say in their circular that "in the examination of the actual comparative wear between Star metal and other (solid brass or Babbitt) bearings, upon the roads in this country testing Star metal, we find, taking the difference in wear and in weight into the calculation, that those roads should pay but 14¼ cents per pound for their (solid brass or Babbitt lined) bearings, to compete in price with Star metal bearings. We therefore claim that those roads lose, per pound, in using brass or Babbitt lined bearings, the amount they pay for same over 14¼ cents per pound; that it is more economical to use Star metal bearings costing 37 cents per pound than others, even at 14¼ cents, on account of less wear upon the journal by the Star metal, and for the reason of its not cutting the same when hot; that it requires less power to draw a train running with Star metal bearings from the fact that where the journal and bearing wear least, there is less friction."

When tested against the brass or Babbitt lined boxes the Star metal bearings have invariably proved superior in the relation of from 40 to 75 per cent. The tests have been made by placing equal numbers of the Star metal boxes and of others under the same car, so that each should have the same amount of wear, and travel the same distance.

New Facts in Spectrum Analysis.

A very curious observation, on the spectrum of a terrestrial flame closely resembling that of certain yellow and red stars, has been communicated to the Italian society—called the Forty—of Modena, by M. Secchi. This flame is that which proceeds from a converter in which Bessemer steel is being made and at the time when the iron is completely decarbonized. The spectrum presents a series of very fine and very numerous lines, similar to those of *a* Orionis and *a* Herculis only reversed. This results from the great number of metals burning in the flame, and is the only flame comparable with the colored stars. There is nothing improbable in this fact when we consider the composition of aerolites in which as is well known, iron predominates.

M. Secchi had formerly ascertained that the spectrum of the color of sea water is deprived successively of its red, yellow and green as its depth increased, and at the greatest depths it appears of a violet blue. He tried to ascertain if the same fact held true in the case of glaciers, and has made experiments in an artificial grotto some three hundred feet deep, in the Grindenwald glacier. The ice wall was nearly fifty feet thick, the solar light that penetrated through was of a fine blue tint, so that human countenances had a cadaverous aspect almost alarming. On looking toward the entry at a certain distance, the cavern appeared to be lit up with a

red light, undoubtedly the effect of contrast. The thickness of the superposed mass was not enough to show a greater effect than the almost complete absence of the red, and a great diminution of the yellow. The ice was perfectly compact, limpid, and with few air bubbles.

Origin of the Connecticut Clock Business.

Bishop, in his "History of American Manufactures," says that the wooden clock manufacture was commenced in Waterbury, Conn., by James Harrison, in 1790, on whose books the first is charged January 1, 1791, at £3 12s. 8d. In East Windsor the brass clock manufacture was carried on by Daniel Burnap. Specimens which are still preserved are said to be nowise inferior in workmanship to the best English clocks of that or any later period. Clocks were also made in East Hartford by a Mr. Cheeny. In 1793, Eli Terry who had been instructed by Burnap in the business as practiced by him and Cheeny, removed from East Windsor, where he had carried on clock-making, to Plymouth, in Litchfield County. His subsequent enterprise and improvements in the art in that place entitle him to be considered the parent of the manufacture in Connecticut. At that time, Thomas Barnes, of Litchfield, and Gideon Roberts, of Bristol, were also known as clock-makers. The kinds of clocks made by these were brass and wooden clocks, with long pendulums, and their price was, for a wooden clock and case, from $18 to $48, the higher priced ones having a brass dial and dial for seconds, and the moon's age, and a more costly case. Brass clocks with a case, cost from $38 to $60. So limited was the sale at those prices, that three or four hundred constituted a stock in trade, and they were carried out for sale by the maker on horseback, the case being procured by the purchaser at from $5 to $30, according to his taste. Terry made both kinds, using a hand engine for cutting the teeth of the wheels and pinions, and a foot lathe for the turned work. In November, 1797, he patented an improvement in clocks, watches, and time-pieces, covering a new construction of an equation clock, showing the difference between apparent and mean time. In 1802, in which year Willard of Boston took a patent for his time-pieces, Terry began the business on a larger scale by water power, and, five or six years after, his success in making them by the thousand, which had been ridiculed as chimerical, enabled him greatly to extend the manufacture, which others now commenced on the wholesale system. In 1814 he introduced a new era in the business by commencing on the Naugatuck river the manufacture of the shelf or mantel clock, which he patented in 1816. The cheapness of these created a wide demand. Several improvements made by him in the mechanism, and the later progress in machinery generally, have increased the annual production in that State to hundreds of thousands, and given to every household a clock, equal to the old ones, at a cost of $2 and upward. His descendants have been engaged in the business to the present time, and his pupil, Chauncey Jerome, since 1821.

Apart from the importance of horological machines in every department of life, and especially in relation to science and business, there are few of the mechanic arts which have furnished more numerous and striking examples of great and useful inventions among its members than the clock and watchmaking business. Many, both in Europe and America, have first exercised in this way their ingenuity, which has afterward conducted to discoveries of universal utility. Rittenhouse, Fitch (also a native of Connecticut), Whittemore, who, before any of the above, also constructed without a model, an efficient wooden clock, Dr. Franklin, and others, might be named. Clock-makers are said to have been the first who employed *special machines* for their manufactures, the wheel-cutting engine having been invented by Dr. Hooke about 1655, and the screw-cutting lathe by Hindley, a clock-maker of York, England, in 1741. The fusee engine and slide rest, the value of which are known to all mechanicians who use metal, are of later introduction, although the latter, in an imperfect form, was used at Rome in 1648, and attained its present form in 1772.

The Assembly of Connecticut, in October, 1783, awarded a patent for fourteen years to Benjamin Hanks, of Litchfield, for a self-winding clock. It was to wind itself by the help of the air, and to keep more regular time than other machines. The principle was made use of in New York and elsewhere.

Practical Application of the Transparency of Metals.

Metals have generally been considered as opaque bodies, not permitting the passage of light through their substance. It is, however, very easy to show, by the use of an extremely thin film, as of gold or silver deposited upon glass, that light passes quite freely through it, and this property has latterly been turned to very good advantage. One of the earliest applications was as a substitute for the ordinary soot-blackened or colored glass, used in observing the sun during an eclipse, or at other times; and the silvering of the objective glass of the great telescope of the Paris Observatory has permitted an investigation of the sun's disk such as could not otherwise be prosecuted. Viewed through a lens, or even a plane glass thus silvered, the sun appears of a soft, blue'sh color, very sharply defined against a black background, formed of the sky. All the peculiarities of the solar image, the different spots and foci in their variations of intensity, and the less luminous marginal regions, are shown with the greatest clearness, and even the filmiest clouds and vapors which seem to sweep over the disk can be readily perceived. The examination can be kept up any length of time without strain to the eyes. The physiological influence is very different from that of colored glasses, the use of which is sometimes very objectionable. Since all the different rays of light pass through the metal (although greatly tempered) except the outermost red rays, which are excluded, together with the dark heat rays, the silver must be deposited in the usual galvanoplastic or chemical manner, so as to form a very delicate film. Gold and platinum may also be used, but silver possesses several advantages.

This property, in the part of metals, of greatly subduing the rays of light without extinguishing them to any extent, and of excluding almost entirely the rays of heat, is now applied to other practical purposes. Weak eyes can use spectacles thus prepared to the greatest advantage, where colored glasses are not to be thought of. For persons whose business keeps them before a glowing fire, such glasses are invaluable, since the sight is not strained by the light, nor the eye-ball injured by the heat, which is measurably excluded. Screens of glass, to be placed before fires, have also been made on the same principle.

By inserting plates of glass thus treated in the panels of doors, or using them as window panes, it will be easy to observe from within all that is going on outside, while it will be impossible to see into the room unless there be another window on the opposite side, so as to show through. The application of the silver to the glass converts it into a mirror, which reflects the light, and to the observer is as opaque as mirrors are generally. The use of such windows wherever an observer within has occasion to notice persons outside without being seen, will be readily understood in the case of prisons, workshops, stores, etc., where, however, as already remarked, there must be but the one opening. The platinized glass has been found most convenient for this purpose.

These few illustrations of a general principle, capable of a great variety of practical applications, show, at the same time, how often the man of science, seeking for the solution of some problem in his theoretical investigations, reaches a result capable of a thousand uses in every day life, which are eagerly caught up and turned to profitable account.—*Phil. Ledger.*

Brunel's Mishaps.

Although Brunel died at the comparatively early age of fifty-three, it is even matter of surprise that he lived so long. He had more perilous escapes from violent death than fall to the lot of most men. We have seen that at the outset of his career, when acting as assistant engineer to his father, in the Thames Tunnel, he had two narrow escapes from drowning by the river suddenly bursting in upon the works. Some time after, when inspecting the shafts of the railway tunnel under Box Hill, he was one day riding a shaggy pony at a rapid pace down the hill, when the animal stumbled and fell, pitching the engineer on his head with great violence; he he was taken up for dead, but eventually recovered. When the Great Western line was finished and at work, he used frequently to ride upon the engine with the driver, and occasionally he drove it himself. One day, when passing through the Box Tunnel upon the engine at considerable speed, Brunel thought he discerned between him and the light some object standing on the same line of road along which his engine was traveling. He instantly turned on the full steam and dashed at the object, which was driven into a thousand pieces. It afterwards turned out to be a contractor's truck, which had broken loose from a ballast train on its way through the tunnel. Another narrow escape which he had was on board the *Great Western* steamship, where he fell down a hatchway into the hold, and was nearly killed. But the most extraordinary accident which befell him was that which occurred while one day playing with his children. Like his father, Sir Marc, he was fond of astonishing them with sleight-of-hand tricks, in which he displayed considerable dexterity; and the feat which he proposed to them on this occasion was the passing of a half-sovereign through his mouth out at his ear. Unfortunately, he swallowed the coin, which dropped into his windpipe. The accident occurred on the 3d of April, 1843, and it was followed by frequent fits of coughing, and occasional uneasiness in the right side of the chest; but so slight was the disturbance of breathing that it was for some time doubted whether the coin had really fallen into the windpipe. After the lapse of fifteen days, Sir B. Brodie met Mr. Key in consultation, and they concurred in the opinion that most probably the half-sovereign was lodged at the bottom of the right bronchus. The day after, Mr. Brunel placed himself in a prone position on his face upon some chairs, and bending his head and neck downwards, he distinctly felt the coin drop towards the glottis. A violent cough ensued, and on resuming the erect posture he felt as if the object again moved downward into the chest. Here was an engineering difficulty, the like of which Mr. Brunel had never before encountered. The mischief was purely mechanical; a foreign body had gone into his breathing apparatus, and must be removed, if at all, by some mechanical expedient. Mr. Brunel was, however, equal to the occasion. He had an apparatus constructed, consisting of a platform which moved upon a hinge in the center. Upon this he had himself strapped, and his body was then inverted, in order that the coin might drop downward by its own weight, and so be expelled. At the first experiment the coin again slipped towards the glottis, but it caused such an alarming fit of convulsive coughing and appearance of choking that danger was apprehended, and the experiment was discontinued. Two days after, on the 25th, the operation of tracheotomy was performed by Sir Benjamin Brodie, assisted by Mr. Key, with the intention of extracting the coin by forceps, if possible. Two attempts to do so were made without success. The introduction of the forceps into the windpipe, on the second occasion, was attended with so excessive a degree of irritation that it was felt the experiment could not be continued without imminent danger to life. The incision in the windpipe was, however, kept open by means of a quill or tube, until May 13, by which time Mr. Brunel's strength had sufficiently recovered to enable the original experiment to be repeated. He was again strapped to his apparatus; his body was inverted; his back was struck gently, and he distinctly felt the coin quit its place on the right side of his chest. The opening in the windpipe allowed him to breathe while the throat was stopped by the coin, and it thus had the effect to prevent the spasmodic action of the glottis. After a few coughs the coin dropped into his mouth. Mr. Brunel used afterwards to say that the moment when he heard the gold piece strike against his upper front teeth, was perhaps the most exquisite in his whole life. The half-sovereign had been in his windpipe for not less than six weeks!

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 12, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $300 on application.

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70,675.—MEAT MANGLER.—A. T. Adams, Indianapolis, Ind.

I claim the combination of the two jaws with the plates, i i, bars, m m, and springs, n n, all arranged and operating as and for the purpose specified.

70,676.—MOTH-PROOF CASE.—James W. Aikin and John H. Stone, Philadelphia, Pa.

We claim a sheet metal moth-proof case for a lady's furs, having the perforated central cylinder A, and the recess, b', in combination with the cylinder B, and the elastic band ring, b'', the said parts being constructed, arranged, and combined to operate together substantially as and for the purpose described.

70,677.—NEEDLE MACHINE.—Walter Aiken, Franklin, N. H.

I claim the machine or combination, substantially as described, for the purpose set forth, that is, as composed of the rotary cutter, A, the grooved rest, E, the series of rotary arbors, K, their carrier or wheel, I, and operative mechanism, the shaft, F, and the mechanism for revolving and moving it longitudinally, and the bolt, s, and mechanism for operating such bolt, substantially as explained.

70,678.—MACHINE FOR MAKING THE TONGUES OF MACHINE KNITTING NEEDLES.—Walter Aiken, Franklin, N. H.

I claim the combination of the carriage, C, the feeder, G, the bowl-forming dies, v v, and the flattening dies, d'' e', all provided with mechanism for operating them, substantially as described.

I also claim the combination of the carriage, C, the feeder, G, the nicking and bowl-forming dies, n' o' w' v', and the flattening dies, d'' e', all provided with mechanism for operating them, substantially as set forth.

I also claim the combination of the carriage, the feeder, the bowl-forming dies (or the latter and the nicking dies), and the punch, f', and punch die, g', all provided with mechanism for operating them, substantially as set forth.

I also claim the combination of the carriage, the feeders, the bowl-forming dies (or the latter and the nicking dies), the punch and punch dies, and the rounding dies, h' i', all provided with mechanism for operating them, substantially as specified.

I also claim the combination of the carriage, the feeder, the bowl, the punching dies (or the latter and the nicking dies), the punch and punch die, the rounding dies, and the separting dies, k' l', all provided with mechanism for operating them, substantially as explained.

70,679.—HOT AIR FURNACE.—Biddle Arthurs, Pittsburgh, Pa.

I claim the drum or heater of sheet or plate iron, with an opening in its bottom and front, connecting with a fire space, c, of brick, the edges of the heater or drum around such opening having flanges, i, built into the furnace walls, constructed and arranged substantially as described for the purposes specified.

70,680.—SAW.—James E. Atwood, Trenton, N. J., assignor to himself and Cyrus H. McCormick, New York city.

I claim the tooth, A, when held in its position by ratchet, c e c, for the purpose herein described.

60,681.—CARRIAGE WHEEL.—Charles C. Ayers, Chelsea, assignor to himself and Henry A. Breed, Lynn, Mass.

I claim the combination as well as the arrangement of the metallic annulus or inner tire, D, with the wooden felly and the spokes and hub, as explained.

I also claim the combination as well as the arrangement of the metallic annulus or inner tire, D, with the wooden felly, the hub, spokes, and outer tire, as described.

I also claim the combination as well as the arrangement of the metallic annulus, D, the wooden felly, the springs and chambers therein, the spokes, and the hub, as described, the hub, under such a combination of the spokes with it and the felly, being suspended from the upper half of the felly and on springs, while the wheel may be in revolution and use.

70,682.—CONSTRUCTION OF SALVERS.—Seth C. Babbitt, Meriden, Conn, assignor to the Meriden Britannia Company.

I claim the mode or process of stiffening the rim or outer edge of a soft-metal or Britannia salver, substantially as described.

I claim a Britannia or soft-metal salver constructed substantially as described.

70,683.—TRUSS.—Charles A. Baker, Auburn, N. Y.

I claim the front pad or plate, E, provided with the rod, A, auxiliary pad, B, and straps, D G and H, all constructed and arranged substantially as and for the purpose set forth.

70,684.—CHALK-LINE REELS.—James Bathgate, Cincinnati, O.

I claim the combined arrangement of the reel, C c, chalk receptacle, D, cap, E, apertures, F G, and line, H, all constructed and employed as and for the purposes specified.

70,685.—MACHINERY FOR LAYING AND TWISTING ROPE.—Stephen Bazin and James A. Bazin, Canton, Mass.

We claim the sliding guide palley, N, in combination with the crane, M, and the winding reel, O, operating substantially as described for the purpose set forth.

We also claim the rolls, v, so arranged as to revolve simultaneously, in combination with the fleeters, b', and the guide pieces, a', or their equivalents, for the purpose of insuring the equal delivery of the strands, substantially as described.

70,686.—TAPERING DRILL.—Jason A. Bidwell, East Boston, Mass.

I claim, 1st, A twisted reamer, c, which is adapted to serve, in conjunction with a spirally grooved drill, a, for making tapering holes in metal, substantially as described.

2d, The construction of a cutting shoulder, e, upon the shank c', of a twisted reamer, c, substantially as described and for the purpose specified.

70,687.—BED BOTTOM.—Albert Bingham (assignor to Wm. T. Mudget), Newtonville, Mass.

What I claim as my invention in a spring bed bottom is as follows, that is to say, having its bolster piece, D, its series of pins, e, and slats, g, supported by springs, f, so as to be movable vertically together thereon, and so that each slats may move independently of the bolster piece and its guide pins, the whole being substantially as described.

I also claim the improved spring bed bottom as constructed, not only with each of its slats, supported at its foot or lower end on a stationary cross bar, but as having a bolster piece, D, series of pins, e, and slats, g, supported by springs, f, so as to be movable vertically together thereon, and so that each slat may move on its spring independently of the bolster piece and its guide pins, the whole being substantially as specified and represented.

70,688.—MACHINE FOR FINISHING WOOLEN CLOTH.—Edwin Birkenshaw, Ashuelot, N. H.

I claim my improved arrangement of the two teasling cylinders, the shearing mechanism, and their two sets of feed rollers, one teasling cylinder under such arrangement being disposed over the other, as described.

I also claim the combination and arrangement of the series of rollers, D D, etc., with the shearing mechanism, the feed rollers, and the two teasling cylinders, as ranged in manner as described and represented.

I also claim the combination, as well as the arrangement of the bridge, F, the series of rollers, D D, etc., the shearing mechanism, the feed rollers, and the two teasling cylinders, arranged as described, the said feeding cylinders and feed rollers being provided with a series of guide rollers arranged with them, as described, and the rotary shearer brush and the teasling cylinders being provided with mechanism for operating them, substantially as herein-before explained.

70,689.—CAR COUPLING.—Luther Boyd and Philip Kriegbaum, Springfield, Ohio.

We claim the movable head, B, as constructed in combination with stationary head, C, slides, e e, and springs, d d, all arranged and operating in the manner and for the purpose herein set forth and described.

70,690.—EVAPORATION AND VAPORIZATION.—M. S. Bringier, Ascension Parish, La.

I claim, 1st, The application of one or more series of tubes of small diameter to the external surface of boilers, kettles, or other vessels, as herein described for the purpose set forth.

2d, The use of a revolving coil of wire gauze, or the equivalent thereof, inside steam-boilers, as herein described for the purpose set forth.

3d, The combination of one or more series of small tubes externally applied to boilers, with an internal revolving coil or cylinder of wire gauze, or its equivalent, as herein described for the purpose set forth.

70,691.—PROCESS FOR EXTRACTING SACCHARINE MATTERS FROM SUGAR CANE.—M. S. Bringier, Ascension Parish, La.

I claim, 1st, Extracting saccharine matter from sugar cane, or other vegetables containing it, by maceration and disintegration, as herein described, when the same is effected by the process and apparatus I have described, or any other which is substantially the same in its mode of operation.

2d, The combination of the receiving-boiler, A, steam pipe, B, pipes H, C, and D, with the shaft, E, when the latter is provided with the disintegrating appliances herein described, for the purpose set forth.

70,692.—MOP WRINGER.—Oscar M. Brooks and Elisha J. Mattson, Janesville, Wis.

We claim, 1st, The inclined supports, e and h, when pivoted at opposite ends of the horizontal yokes, H, and used to support two parallel and similarly operating rolls, B B, substantially as described.

2d, The combination and arrangement of a treadle, F, pivoted at the ends of two horizontal yokes, H, with the connecting links, f and g, springs, i, inclined supports, e and h, and horizontal yokes, H, when the whole are constructed, arranged and used substantially as described.

70,693.—WASHING MACHINE.—Alexander R. Campbell, Chelsenham, Mo.

I claim the rock shaft, e, semi-circular corrugated casher, E, corrugated dash board, g, smooth dash board, h, shafts, k, cross bar, M, braces, n, cover, o, standards, d, dove-tailed slots, q, and the corrugated circular and square ends of a washing machine, all in combination, when constructed and operating substantially as shown and specified.

70,694.—MODE OF ATTACHING FERRULES TO HANDLES.—Asa L. Carrier, Washington, D. C.

I claim the ferrule, b, constructed and applied to tool handles, umbrellas and canes, substantially as described and operating as and for the purposes set forth.

70,695.—HORSE HAY FORK.—William Carroll, Hillsdale, Mich., assigner to himself and S. H. Rhodes, Clyde, Ohio.

I claim the toggle joint, E, springs, D, and nuts, f, in combination with the tubular shaft and rod, substantially as and for the purpose set forth.

70,696.—CAR TRUCK.—S. A. Chase (assignor to himself and Stephen Smith), Boston, Mass.

I claim, 1st, The combination with the main axles and wheels of a car truck of the upper rollers when supported in elongated bearings, substantially as and for the purposes described.

2d, The combination with the journals, c c, of their elongated bearings and lubricating chambers, substantially in the manner and for the purposes set forth.

70,697.—JOURNAL BOX FOR CARS.—G. H. Clemens, Baltimore, Md., assignor to himself and Henry A. Chadwick, Washington, D. C.

I claim, 1st, The hollow box, E, having the blocks of wood arranged therein, said box being formed spherical on its upper surface to permit of its adjusting itself to the journal, as herein described.

2d, In combination with the box, E, constructed as described, I claim the case composed of the parts, G and H, constructed as set forth.

70,698.—CHAIR.—Harrison Cole, Cincinnati, Ohio.

I claim the three-legged chair standard, A, in combination with the brace, A, and the lugs, C C C and C' C' C', for attaching it to the floor and chair bottom, substantially as shown.

70,699.—DOOR AND WINDOW FASTENER.—Washington J. Corthell and Philip Richards, Boston, Mass.

We claim the combination and arrangement of the knob and shank, d and e, the projection, f, and the spring, h, with the bolt, b, constructed with its recess, c, moving back and forth in the case, a, substantially in the manner and for the purpose above set forth.

70,700.—HORSE HAY FORK.—J. S. Culver, Springport, N. Y.

I claim the attaching of shoulder pieces to the main stem of the hay elevating fork, substantially as and for the purpose delcribed.

70,701.—BRACKET FOR LAMPS.—Robert Devereux (assignor to himself and Bernard H. Muehle), Buffalo, N. Y.

I claim the circular rim, A, having an opening, D, for the purpose and substantially as herein set forth and described.

70,702.—BLIND STAPLE.—Frank Douglas, Norwich, Conn.

I claim as a new article of manufacture a blind staple of corrugated wire, as herein described.

70,703.—BLUING PAPER FOR LAUNDRY PURPOSES.—Theodore Dreidel, Cincinnati, Ohio.

I claim the prepared bluing paper for laundry purposes, substantially as set forth.

70,704.—MODE OF PRODUCING HYDROGEN GAS.—Cyprier Marie Eessié Du Motay and Charles Raphael Maréchal, Metz, France.

We claim the method of and means for producing or generating hydrogen gas, substantially as herein set forth and described.

70,705.—MODE OF PRODUCING OXYGEN GAS.—Cyprier Marie Eessié Du Motay and Charles Raphael Maréchal, Metz, France.

We claim the method of and means for obtaining oxygen gas from atmospheric air, substantially as and for the purposes herein set forth and described.

70,706.—CLOTH-FOLDING MACHINE.—Henry Dunphy, New York city.

I claim, 1st, The arrangement for holding the folders in the machine consisting of the clamps, e, in combination with the cheeks a a, of the holders, B, the whole constructed and operating substantially as described and specified.

2d, The rollers, F F, provided with narrow rings of leather, rubber, or other similar material, in combination with the folding apparatus, substantially as described and specified.

3d, The hinged ironer, D, in combination with the folding apparatus, substantially as described and specified.

4th, The laterally and back-and-forward adjusting, retaining, and stretching apparatus consisting of the roller, n, bar, p, and traversing blocks, o and r r, in combination with this apparatus, substantially as described and specified.

5th, The roller, n, tapering toward both ends for spreading and stretching the cloth in combination with the laterally and back-and forward adjusting mechanism and the folding apparatus, substantially as described and specified.

70,707.—STEAM ENGINE.—Charles E. Emery, Brooklyn, N. Y.

I claim, 1st, Lining the interior surfaces of the cylinders of engines operated by steam or heated gas with glass, porcelain, enamel, or equivalent substance, in manner substantially as described to produce the results specified.

2d, The combination of the cylinder, X, with the cylinder, N, or its equivalent.

3d, The elongated piston, A, in combination with the lining or protecting material, x x.

4th, The combination of the pipe, b, with the piston rod or trunk, all substantially as and for the purposes herein set forth.

70,708.—PAPER FILE.—William Fallon, Washington, D. C.

I claim the combination of a folding extension back to file binders with flap in front, and india-rubber strap with reinforce on each end and clasps for same, as described herein.

70,709.—SALT SIFTER.—William A. Fenn, Wolcott, N. Y.

I claim, 1st, The arrangement of the plate, C, in combination with the bottle or case, A so as to operate in the manner described.

2d, In combination with the above, I claim the arrangement of a spring so as to return the plate, substantially as herein set forth.

70,710.—MOLDS FOR CASTING STEEL INGOTS.—John E. Fry, Johnstown, Pa.

I claim the series of iron ingot molds, e e, in combination with the sand core, a, constructed substantially as hereinbefore described for the purpose set forth.

70,711.—BELT CUTTER.—Moses C. Goodale (assignor to himself and Louis Godder), Lowell, Mass.

I claim the arm, f, with its punch seat, h, when arranged to operate substantially as described and fully set forth.

Also the arrangement and construction of the knife, b, awl, n, and punch, e, in combination with the pliers, k and m, all for the purposes substantially as herein described.

70,712.—APPARATUS FOR BURNING HYDROCARBON OILS.—Mathew T. Gosnell, Baltimore, Md.

I claim the combination and arrangement of a tube or pipes B B, a perforated hearth, B, a valve or valves or inlets (for admission of atmospheric air), D D, with a boiler, A, and furnace, E, or their equivalents, in the manner and for the purposes set forth.

70,713.—DEVICE FOR THE ADJUSTMENT OF LOOKING GLASSES IN DRESSING CASES.—Alfred A. Gray and William C. Hyde, Detroit, Mich.

We claim the hinge and movable hinge plate, the thumb screw, or screw that secures the hinge plate, and the mode of adjustment, substantially as and for the purpose set forth.

70,714.—SASH FASTENER.—E. Herbster (assignor to himself, T. Tripp and E. F. Brown), Chicago, Ill.

I claim, 1st, The combination of wheel, D, having holes, b b etc., with pin, E, arranged to operate in sleeve, F, having slots, h and n, for the purpose of locking sash, substantially as herein set forth.

2d, The combination of wheel, D, spring, C, pin, E, sleeve, F and key, T arranged to wind said spring up and to fasten sash, substantially as and for the purpose set forth.

70,715.—PAPER-RULING MACHINE.—William O. Hickok, Harrisburg, Pa.

I claim the application thereto of a stationary table, G, so that it will operate in combination with the web, E, cords, F, and feed rolls, D D', substantially in the manner described and set forth for the purpose specified.

70,716.—WRAPPER FOR NEEDLES.—Jason Hill, Astwood, near Redditch, England.

I claim, in combination with a wrapper in or on which needles are placed or stuck, an incision or flap at or near the upper left hand corner for forming a cover for and for gaining access to the tops of the needles, substantially as and for the purposes described.

70,717.—CLUTCH FOR HAY ELEVATORS.—N. D. Hinman, Stepney Depot, Conn.

I claim, 1st, The arrangement described of the levers, L and N, with the yoke, R, and pulley, E, when constructed so as to operate in the manner and for the purpose substantially as set forth.

2d, The combination of the levers L M and N, when constructed so as to operate as and for the purpose specified.

70,718.—POCKET CUTLERY.—Peter S. Hoe, New York city.

I claim the combination, in a single instrument, of a knife, pincers and hodkin arranged to open and shut like a pocket knife, substantially as described and specified.

70,719.—SCRAPER.—William J. Horner, Cincinnati, Ohio.

I claim, in combination with the divided and hinged beam, A B C, shovel, D, and handles, E, the tongue, F, self-locking catch, G, and trigger, L, substantially as and for the purposes set forth.

70,720.—HAY OR COTTON PRESS.—Frank Horton (assignor to himself and Albert Horton), Silver Creek, N. Y.

I claim, 1st, Attaching the draft chains, C, to the follower, B, at points inside of the press frame, A' (the sides of the press box being slotted longitudinally for the passage of the chains) for the purpose described.

2d, Leading the draft chains, C, when placed within the press box over the sheaves, C', and obliquely to or nearly to the center of the windlass shaft, D, in the manner and for the purpose described.

3d, The locking device applied to the top covers, F and G, and side door, I, composed of the lever, H, hinged loop, h1, and staple or hook, h2, substantially as described.

70,721.—MODE OF PREVENTING THE EXPLOSION OF LAMPS.—Edward Howard, Redhill, England.

I claim the application of the long tube, A, before named and the substitution for the usual openings of a groove in the collar of the vase, C, so that by no opening can the flame of the lamp reach the gas in the vase.

70,722.—INVALID BEDSTEAD.—S. P. Johnson (assignor to himself and Charles B. Whittemore), Portland, Me.

I claim, 1st, The double-swinging lever, g, as and for the purposes set forth.

2d, The arrangement of the folding legs, 1 2 3, etc., having the pins on their inner sides, with the folding braces having the longitudinal and transverse slots, as and for the purposes described.

3d, The arrangement and combination of the rod, k, lever, j, ratchet, n, and pin, m, as and for the purposes set forth.

70,723.—CORN-POPPER.—Edward G. Kinsley, Stoughton, Mass.

I claim the corn-popper, as made with the perforated divisional partition, B, extended across its box, A, of woven wire, substantially as described, and for the purpose as specified.

70,724.—WATCH ESCAPEMENT.—William H. Lamb, San Francisco, Cal.

I claim, 1st, The construction of an escapement for timepieces, in such a manner as to pass the teeth upon opposite sides of the balance staff, thereby giving an impulse on both the right and left vibration, substantially as herein described.

2d, Unlocking pin, g, from the teeth, n, of the escape wheel, by the the liberating pin, on the balance staff coming in contact with the end of the detent lever, d, substantially as described; and,

3d, The combination of the wheels, D and E, operating on each, side of the balance staff by means of the notched rollers, b and c, or their equivalent, and the liberating pin, i, operating on the end of the detent lever, d, and the the pin, g, the whole operating as and for the purpose herein specified and described.

70,725.—CHURN.—C. H. Lee, Oskaloosa, Iowa.

I claim the churn, A, provided with a turret, in combination with a mouth piece, B, so constructed as to admit a free circulation of air in the churn, and at the same time prevent the cream from escaping, substantially as herein set forth and described.

70,726.—BLIND FASTENING.—Goodrich Lightfoot (assignor to himself and Joseph B. Lightfoot), Elgin, Ill.

I claim the jointed rod, L, in combination with hinges, e and e'', when constructed and operated substantially in the manner and for the purpose specified.

70,727.—INSULATOR FOR LIGHTNING-RODS.—Thomas J. Lockhart and Josiah Locke, Pittsburg, Pa.

We claim the application to lightning-rod insulators of the metallic shank, E, as herein described, or any other substantially the same, and which will produce the intended effect.

70,728.—SAW.—James K. Lockwood, Alpena, Mich.

I claim a circular saw, constructed with more or less slots, D, upon radial lines from the eye toward the periphery, and terminating in holes, C, in combination with the oblong holes or slots, E, for the purposes substantially as set forth.

70,729.—CAR COUPLING.—Samuel L. Loomis, Byron, N. Y.

I claim, in a draw-head or bumper of a railroad car, a spring so constructed and arranged as to serve the purposes of sustaining the pin until the link enters, and holding the link horizontal for the purpose of coupling, substantially as described.

And, in combination with a spring constructed and arranged as above claimed, I claim a coupling-pin with a shouldered end or point, as and for the purposes set forth.

And, in combination with a pin having a shoulder near the point, I claim a projection or plate, H, in the bumper or draw-head.

70,730.—HARVESTER.—Charles W. Marsh and William W. Marsh, Shabbona, Ill.

We claim, 1st, The arrangement of the several pulleys, C E, and G, with tightening or adjustable pulley, D, so that drive-belt, H, may give motion to both drums, K and L, of band of rakes, M, and revolving platform, N, substantially as and for the purpose described.

2d, We claim the adjustable pulley, D, on slide, d, working in groove in plate, f, as described.

3d, We claim the adjustable frame, A, when used in connection with the tightening or adjustable pulley, D, substantially as and for the purpose specified.

70,731.—RAILROAD TRACK.—Henry McCan, Hanover, Ohio.

I claim the construction and arrangement of the base and tread rails, A B, in combination with the chairs and ties, D E, and adjusting bolts, F, in the manner substantially as set forth.

70,732.—MODE OF OBTAINING MOTIVE POWER FROM PETROLEUM AND OTHER OILS.—Robert D. McCreary, Oil City, Pa.

I claim, 1st, The process herein described of producing motive power from oil without wholly destroying its lubricating or illuminating properties, or its value for refining or for other purposes.

2d, I further claim the combined process of partially evaporating oil to obtain motive power, without destroying its valuable properties, and using the resultant gases for fuel or illumination after their expansive force has been or partially so spent in driving the engine.

70,733.—PUMP.—John H. McGowan, and Theodore H. McGowan, Cincinnati, Ohio.

We claim a suction pipe coupling, E E', in connection with a pump cylinder or cylinders A, so constructed as that, when attached to the pump, it will form a reservoir, which will maintain a constant supply of water, and in which the pump cylinder is partly or wholly submerged, substantially as described, and for the purpose specified.

70,734.—COWL OR CHIMNEY CAP.—Charles G. Miller, Cincinnati, Ohio.

I claim the parts, B D E F H I, upon the top of a chimney, arranged substantially as described.

70,735.—DROPPER FOR HARVESTERS.—Lewis Miller, Akron, Ohio.

I claim, 1st, An apron for holding the falling grain, that is wound up and unwound by a traveling roller, and rack and pinion attachments, substantially as described.

2d, Also, in combination with a traveling roller, and an apron wound up and unwound by it, a holding-bar or board, that is thrown into and out of action by the roller, substantially as and for the purpose described.

70,736.—FAN-BLOWER.—Warren P. Miller, San Francisco, Cal.

I claim a blower, consisting of two or more wheels, constructed and operated in manner as described.

70,737.—PRESERVATIVE BLACKING FOR LEATHER.—William B. Moore, Winchester, Mo.

I claim a blacking and leather preservative, composed of the ingredients hereinbefore named, and compounded in the manner and in the proportions substantially as described.

70,738.—MACHINE FOR SETTING UP STAVES IN BARRELS.—James A. Morrell, Chicago, Ill.

I claim, 1st, The buttons, C, provided with the springs, c, substantially as and for the purposes specified.

2d, The adjustable truss-hoop supporter, D E, constructed and operating substantially as set forth.

3d, The hoop or band, C, for keeping in place and supporting the lower ends of the staves, substantially as specified.

4th, The lock or stop, a, for holding the truss hoop supporters in place, substantially as described.

5th, The standard or cylinder, A, base, B, and buttons, c, in combination with the truss supports, D E, and truss-hoop, F, substantially as and for the purposes specified.

70,739.—LAND ROLLER.—E. F. Olds, Lyon, Mich.

I claim, 1st, Hanging the rollers by means of their shafts or gudgeons to a central adjusting frame, so constructed and arranged that said rollers may be weighted more or less on either side by means of said frame, and the rollers rendered self-adjustable to the surface of the ground, as and for the purpose substantially as set forth.

2d, The central adjustable frame, E, constructed so as to be weighted, in combination with the rollers, B, substantially as and for the purpose set forth.

3d, The caster-wheels, L, and springs, M, in combination with the frame, C, and rollers, substantially as and for the purpose set forth.

70,740.—FLASK FOR CASTING TWEERS.—Beneville C. Painter, Mechanicsburg, Pa.

I claim, 1st, In combination with the sections, A B, of the flask, the partitions, I K, and false or removable bottom, D, arranged as and for the purpose described.

2d, Also, in combination with the previously made tube, G, the ferrule, e, and slide, F, in the section, B, for the purpose of molding in the tube, and removing the finished casting from the flask, substantially as described.

70,741.—LIGHTNING CONDUCTOR.—William G. Pike, Philadelphia, Pa.

I claim, 1st, A lightning conductor, consisting of a cylindrical or flattened tube or gasket of woven, braided, or plaited wire, terminated at its upper end by a solid point, substantially as shown and described.

2d, The angular rod, c, for connecting separate branches of the tubular conductor, constructed substantially as set forth.

3d, The combination of the wire tube, a, solid point, b, inserted rod, c, and insulators, d, arranged and constructed in the manner and for the purpose substantially as set forth.

70,742.—MIXING AND DRYING CYLINDER.—Leman B. Pitcher, Salina, N. Y.

I claim the crooked arm, A, the head, B, with the feeding hole, b, therein, each separately and in combination, with each other, and each also in combination with the cylinder, C, made and operated substantially as and for the purpose described.

70,743.—STEAM ENGINE CUT-OFF.—George W. Rawson, Cambridgeport, assignor to himself and Michael Hittinger, Somerville, Mass.

I claim the combination of the slide valve, the two gates, their openings and mechanisms, substantially as described, for operating such gates in manner as specified.

I also claim the said mechanism or combination, substantially as described, for operating the gates of the slide valve through the agency of a governor, and the mechanism for producing the longitudinal movements of the slide valve, such mechanism or combination first mentioned consisting of the tripper, p the notched slide bars, g g, the pawls or catches, m m, the springs, k k, the arms, f f, and the studs, r s, the whole being arranged and applied to the steam chest and the slide valve, substantially in manner and so as to operate as hereinbefore specified.

70,744.—HARVESTER.—George Riemer, Fayette, N. Y.

I claim the combination, with the sickle bar, H, and grooved wheel, G, provided with the rim, a, and made removable from its shaft, of the friction roller, I, arranged and operating in the manner and for the purpose herein set forth.

70,745.—BRIDLE BIT.—A. H. Rockwell, Harpersville, N. Y.

I claim, 1st, The mouthpiece, A, when composed of three links, d e, and e', and when combined with the sliding bars, f f, and with the rings, g g', or their equivalents, all made and operating substantially as herein shown and described.

2d, The bars, f and f', when made to slide on a flexible mouthpiece, when connected with the nose strap, B, and when made and operating substantially as and for the purpose herein shown and described.

70,746.—STEAM GENERATOR.—Robert E. Rogers, and James Black, Philadelphia, Pa.

We claim the boiler, A, having the enlargement, a, formed so as to project at or about a right angle with the body of the boiler, in combination with the circulating tubes, B, when the upper ends of said tubes are inserted straight into the enlargement, a, and the lower ends of said tubes are bent and inserted into the lower portion of the body of the boiler, A, substantially as set forth.

70,747.—HAND CORN PLANTER.—McCollum Russell and Alfred G. Burdick, Mill Rock, Iowa.

We claim, 1st, The plunger, E, provided with a pocket, e, regulating slide, J, and metallic end, K, in combination with the opening in the bottom, D, of the seed chamber, brush, d, and springs or scrapers, B B C C, substantially as and for the purpose set forth.

2d, The cell or pocket, e, in combination with the regulating slide, J, and brush, d, substantially as and for the purpose described.

3d, The combination and arrangement of the stop, L, strap, H, pin, h', button, L, and plunger, E, substantially as and for the purpose specified.

70,748.—CONSTRUCTION OF BUTT HINGES.—D. C. Sage, Middletown, Conn.

I claim, 1st, The attachment of butt hinges to door casings and doors by means of hooks and plates, substantially as described.

2d, The construction of the leaves of hinges with hooks, a a, or their equivalents, upon them, for being received by perforated plates, B, substantially as described.

3d, The washers, d, of hardened metal, and detached from the pintle of the hinge, applied in recesses at the joints of the hinge, substantially in the manner and for the purpose described.

70,749.—COAT AND HAT HOOK.—J. B. Sargent, New Haven, Conn.

I claim a coat and hat hook, consisting of the plate, C, and hook or hooks, A or B, or both, on which the knob, D, is secured by a rivet or screw passing therethrough, in the manner described.

70,750.—SNAP HOOK.—J. B. Sargent, New Haven, Conn.

I claim, 1st, The double tongue, D, in combination with the hook, A, when constructed so as to operate substantially as described.

2d, The thumb-piece, E, in combination with the tongue, D, of a snap hook, so as to lock and secure the snap when closed.

70,751.—SAW SET.—Amos M. Shafer, Camden, Ohio.

I claim, 1st, The screw standard, H h, and hand nut, I, in combination with the spring, F, constructed and operating substantially as and for the purpose set forth.

2d, Preserving the parallelism of the sliding rest, P, with the anvil, and at the same time changing its relative hight with said anvil, by sliding the inclined edge of the said rest in brackets, M O Q M' O' Q', substantially as described.

70,752.—COG CHAIN.—Thos. Shaw, Philadelphia, Pa.

I claim the chain link, as constructed, for the purpose specified.

70,753.—CORN PLANTER.—William H. Shepherd, College Corner, Ohio.

I claim, 1st, The grain-dropping frame consisting of the cross beam, I, and grain slides, J J', arranged substantially as shown.

2d, The blocks, O, to indicate the position of the hills, as set forth.

3d, The provision of side beams, F F', pin, f, slot, l', and screw, e, for the purpose stated.

4th, The provision for liberating the hinged piece, L', allowing of the spouts M, to swing clear of the ground, as stated, and for the purpose set forth.

5th, The arrangement of the parts, h h' h'', for the purpose of disconnecting the seeding frame from the crank, G, as and for the purpose set forth.

70,754.—MODE OF SEPARATING VEGETABLE MATTER FROM ANIMAL FIBERS.—Henry Sherwood, London, Great Britain.

I claim, 1st, To disaggregate vegetable fibers or substances by means of their exposure to gaseous sulphuric anhyride, and to anhydrous chlorohydric gas, each used alone or together, or in mixture with other gases not being the elements of water; but I do not claim the use of vapors produced by evaporating the sulphuric or muriatic acids of commerce, except the oxygen of the aqueous particles contained in those vapors be first eliminated, or caused to enter into chemical combination with some other element to form an oxide.

2d, I claim, in an instrument necessary for making use of gaseous agents, the combination of air-tight rollers, a and b, to receive substances into a cavity filled with an atmosphere of gases, and to deliver them from it, with any known mechanical arrangement applicable to receiving the substances from the ingress-rollers and delivering them to the egress rollers, (one of such arrangements being given as an example, c,) acting substantially, and capable of modification, as described.

3d, I claim to prepare vegetable fibers for paper making and other uses, by submitting them to the action of known agents in closed cisterns containing liquids at a low heat, (under 100° centigrade,) but under pressure of air or of liquids.

70,755.—MACHINE FOR TEMPERING FILES, SAW BLADES, AND OTHER ARTICLES.—John Small, St. Louis, Mo.

I claim, 1st, In a machine which is adapted for tempering files or plates and confining them between clamps during the tempering process, constructing the box containing said clamps wholly or partly of glass, substantially as described.

2d, The construction of the grated clamps, D D', with bracing ribs upon their backs, in combination with double-acting screw shafts for moving these clamps, substantially as described.

3d, The arrangement of the clamps, D D', in inclined planes within a bath or box, A, and upon double-acting screw shafts, E, operated and operating substantially as described.

4th, The hinged plate or apron, J, applied to the jaw, D, in combination with movable hooked rods, g, substantially as described.

5th, The standard, H, provided with pulleys, h h', upon its upper end, over which ropes or chains pass, which are attached to the hinged apron, J, and also to the cross head of hooked rods, g, substantially as described.

70,756.—SPRING ROCKINGCHAIR.—Edmund Smith, Jr., Worcester, assignor to Albert Goodspeed, Hubbardston, Mass.

I claim, in combination with the frame and seat of a chair, the springs, a a', a'', with their opposite ends fastened respectively towards the front and rear of the chair, all arranged and combined substantially in the manner and for the purposes above set forth and described.

70,757.—STEAM GENERATOR.—Jas. T. Smith and John Walter, Baltimore, Md.

We claim, 1st, The interior series of boilers, A, connected with tubes, a, and supplied with caps, e, at each end, the whole constructed and operating substantially as set forth.

2d, The mud-sills, E, pipes, H, in combination with the outside tier of boilers, A, operating as and for the purpose substantially as herein described.

3d, The goose neck branch pipes, L, in combination with the central tier of boilers, A, constructed as and for the purpose substantially as set forth.

70,758.—LOW-WATER INDICATOR.—L. Franklin Smith, Philadelphia, Pa.

I claim, 1st, The arrangement of the water gage, O, chambers, P and P', and three-way cocks, M and Q, in relation to the boiler, and with reference to the expanding tube, C, and fixed rod, G, substantially as described and for the purposes specified.

2d, The arrangement of the weight, N with the lever, H, and arm, h, for closing the valve, K, substantially as described.

70,759.—CASKET HANDLE.—William M. Smith (assignor to himself and the Meriden Britannia Company), West Meriden, Conn.

I claim the employment of attachments, D, or their equivalents, having tags, E, in combination with the depressions formed in the plates, B, substantially as and for the purpose described.

70,760.—SASH STOP.—Henry Soggs, Columbus, Pa.

I claim, 1st, The combination and arrangement of the pinion, E, and winch, F, applied to the jamb, with the rack bar, D', and friction rollers, f', applied to the sash in the manner and for the purposes set forth.

2d, The spring catch, G, in combination with the winch, and operating in the manner and for the purpose.

70,761.—PROCESS OF PREVENTING DECAY IN WOOD.—J. H. Taylor, New York city.

I claim, 1st, The chemical combinations of the above-named agents, in the manner described, for the purpose of preserving wood and other fibrous materials from decay.

2d, The combination of these potent antiseptics in the form of vapor, acting in accordance with known chemical laws, in the manner and for the purpose described.

70,762.—GATE.—G. L. Templeton, Pierceton, Ind.

I claim the cam, H, made of round wire, or similar material, and secured to the inner wing, E, in combination with the outer slotted wing, F, roller, I, gate, A, and frame, B, having a slot, J', arranged and operating substantially as and for the purposes set forth.

70,763.—CARRIAGE JACK.—Isaac Varney, Kenebunk, Me.

I claim the arrangement and combination of the arm, D, toothed slide, C, gear, b, casing, a, centrally-pivoted pawl, c, and spring pawl, t r, on the bolster cylinder, B, substantially as and for the purposes set forth.

70,764.—WELL TUBE.—Joseph Wagner, Newcastle, Pa.

I claim, 1st, The perforated stem, C, of the point, B, encased within the tube, A, in combination with the slot, a, and pin, b, substantially as and for the purpose described.

2d, The combination of the point, B, constructed as described, with the perforated stem, C, perforated tube, A, slot, a, and pin, b, substantially as and for the purposes described.

70,765.—FOUNTAIN PEN.—Michael Wagner (assignor to himself and Herman Witte), Cincinnati, O.

I claim the winged bristle socket, J K, sheath, C D F, scallops, E, slot, L, and stud, H, slot, G, combined, arranged, and operating as and for the purpose specified.

70,766.—MANGLE.—H. Wehdeking, Edgerton, O.

I claim, 1st, Tightening the linen bed and shortening the same, by the ac

rangement of the arms, A A A A, holes, a a, and pins, b b b b, in combination with the stationary arms, B B, substantially in the manner as herein described and shown.

2d, The construction and arrangement of the legs or lower part of the mangle, in combination with the rods, I I, substantially in the manner and for the purpose as herein described and shown.

3d, The arrangement of the wooden spring, J, rubber springs, I I, rods, i i, rollers, F and H, in combination with the arms, A A A A, and arms, B B, and the legs of the mangle, substantially in the manner and for the purpose as herein described and shown.

70,767.—COMPOSITION FOR INKING ROLLERS AND PADS.—J. M. Wilbur, Cleveland, O.

I claim the composition for ink rollers or pads consisting of the ingredients in about the proportions herein given, as and for the purpose specified.

70,768.—HORSE POWER.—Wm. H. Wiley, Fredonia, N. Y.

I claim, 1st, Extending the frame of the machine laterally across and beyond the circular track travelled by the horses, and providing the same with slides for the reception of a drag saw cross head and with bed pieces for the horizontal shaft pillow blocks, in the manner and for the purposes described.

2d, Securing the pinion spindles, D, to the tab'e, C, at varying distances from the center thereof, so that different sizes of pinions to gear with cog rim, F, and spur wheels to gear with pinion, b', may be used, as and for the purpose set forth.

70,769.—EGG STAND AND BOILER.—Edward P. Woods and Daniel Sherwood (assignor to Woods, Sherwood & Co.,) Lowell, Mass.

We claim, as a new article of manufacture, an egg stand and boiler, constructed substantially as described and for the purposes specified.

70,770.—MACHINE FOR MAKING WIRE DISH STANDS, ETC.—Edward P. Woods and Daniel Sherwood, (assignors to Woods, Sherwood & Co.,) Lowell, Mass.

We claim, 1st, The spiral grooved head or former, constructed substantially as described and specified.

2d, The combination of the spiral grooved head or former with the bar, G, substantially as described and specified.

3d, The combination, with the spiral grooved head or former, of the slots, c c c c, substantially as described and specified.

70,771.—MORTISING MACHINE.—Charles L. Zeidler, Cincinnati, Ohio.

I claim, 1st, The arrangement of continuously vibrated bell crank, D, having the arm, G, and wrist, g, connected on one side by pitman, H, to the chisel bar, and on the other side to a wrist, K, actuated by an obliquely slotted slide, L, under control of the operator, constructed and operating substantially as and for the purpose set forth.

2d, The arrangement of fast and loose sleeves, Q and R, upon the chisel-shaft or stem, engaging and releasing pawls or catches, S and T, cord, U, and pulley, V, in combination with the catch or trigger, H, and tappet, l'', rack and pinion, v' l', and actuating and balancing springs, W and N, constructed and operating substantially as and for the purpose set forth.

70,772.—DITCHING MACHINE.—Isaac V. Adair (assignor to himself and Peter Wyckoff,) Varick, N. Y.

I claim, 1st, The arrangement of the wheels, A, axles, B, frame, C, pulley, B', band, A', endless chain of buckets, U, frame, S, adjustable brace bars, C, and D, and frame, F, with each other, substantially as herein shown and described and for the purpose set forth.

2d, The frames, F and C, when connected together by the adjustable bar, R, and draft chain, P, substantially as herein shown and described and for the purpose set forth.

3, The combination of the gage wheel, H, straps, I and J, lever, K, chain, L, and lever, M, with each other, and with the frames, C and F, substantially as herein shown and described and for the purpose set forth.

70,773.—PRINTING PRESS.—Edwin Allen, Norwich, Conn.

I claim the combination of the adjustable or sliding taper rollers, L, with inking roll shaft, k, hung and controlled essentially as described, and disks, K, for operation together, substantially as and for the purpose or purposes herein set forth.

70,774.—STEAM ENGINE.—Ernesto Ansaldi, Leghorn, Italy.

I claim the arrangement of the steam ports, passages, valves, and chests, as described, with the piston of two steam cylinders and their connections, to be in combination with each other, for the purpose of mutually assisting each other for overcoming the dead points of their strokes when accomplished by the means substantially as described and illustrated in the drawings.

70,775.—BELT LACING.—Holland C. Babcock, Cincinnati, O.

I claim the belt lacing provided with a pointed or stiffened tip, B or B', a slit, C, and secured fo packing in a coiled form by tag, D, or its equivalent, substantially as and for the object stated.

70,776.—CAR COUPLING.—Peter Baker, Oakland, Md.

I claim, 1st, The coupling pin, B, provided with the flange, e, in combination with the hinge, E, and lever, C, when arranged to operate substantially as herein described and for the purpose set forth.

2d, The draw head, A, when arranged to be adjusted vertically in combination with the frame, G, substantially as herein described.

70,777.—ELEVATOR.—Jas. S. Baldwin, Newark, N. J.

I claim, 1st, The use of the apron, B, and the apron, C, or equivalent yielding edges, substantially as set forth.

2d, The secondary platform, F, and its apron, D.

3d, The balancing of said aprons in the manner set forth.

70,778.—ATTACHING BOLSTERS TO KNIVES.—Henry Barber, Greenfield, Mass.

I claim attaching the bolsters upon the tang by means of projections, a a' and b b', upon each side of the bolsters, the projections being clinched on the top and bottom sides of the tang, substantially as and for the purpose shown.

70,779.—CULTIVATOR.—Morgan Barnett and Eli Wood, Hardinsburg, Ind.

We claim, 1st, The plough frames formed by the combination of the beams, G, standards, E, and adjustable brace bars, i, with each other, substantially in the manner herein shown and described and for the purpose set forth.

2d, Pivoting the beams, G, upon the forward side of the axle, B, by means of the rods or bolts, J, and clips, K, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the locking keys, P, with the forward ends of the beams, G, and with the rods or bolts, J, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the guide frames, M, with the beams, G, and rods or bolts, J and N, substantially as herein shown and described and for the purposes set forth.

5th, The combination of the levers, L, with the beams, G, and guide frames, M, substantially as herein shown and described and for the purpose set forth.

6th, The combination of the graduated stop-lever, O, with the beams, G, and guide frames, M, substantially as herein shown and described and for the purpose set forth.

70,780.—HAM-SLICING HOLDER.—John Baumgartner and Lawrence Angster, Newark N. J.

We claim the guard or arm, B, the brace, F G, the lever, and rack, E, operating together in manner substantially as and for the purposes described and set forth.

70,781.—SEEDING MACHINE.—R. Baxter, French Camp, Cal.

I claim, 1st, The seed box, constructed as described, and provided with a rod and prongs, so located that a part of the several prongs only is in the box, and that at the front side thereof, as and for the purpose described.

2d, The elbow lever, operated by a pin on the plow wheel, and operating the rod with its prongs, in combination with the said rod, in the manner and for the object set forth.

70,782.—BEEHIVE.—James M. Beebe, Casadaga, N. Y.

I claim the series of frames, C C, constructed and bound together, as described, when said frames are used within the casing, A B, formed, as herein set forth, with honey boxes, F F, spaces, bottom board, I, and openings, e d, the whole constructed, arranged, and used in the manner and for the purposes set forth.

70,783.—HORSESHOE.—Jacob Bebel and John Perrine, Rockford, and John M. Buell, Ogle county, Ill.

We claim, 1st, The movable clips, a1 and a2, when constructed and attached substantially as set forth.

2d, The combination of the movable clips, a1 a2, and shoe, A, having beveled recesses, x, to receive the same, substantially as described.

3d, The combination of the movable clips, a1 a2, and the shoe, A, constructed with corresponding recesses, x, and projections, c c, substantially as described.

4th, The combination of the movable clips, a1 a2, and shoe, A, constructed with stationary clips, y, and projections, c and k, substantially as described.

70,784.—STEAM ENGINE SLIDE-VALVE.—E. H. Bellows, Worcester, Mass.

I claim, 1st, A four port balanced valve, E, constructed and operating substantially as and for the purposes set forth.

2d, The combination with the steam chest, A, having a projection or flange, e, of the valve, E, substantially as set forth.

3d, The combination with valve, E, of cap, H, and projections or flanges, c d f and cars, c c, substantially as and for the purposes set forth.

70,785.—CULTIVATORS.—Alfred C. Belt, Goresville, Va.

I claim, 1st, The reversed arrangement of the alternate teeth of the cultivator, as described.

2d, The cultivator teeth arranged in reversed positions, as described, in combination with the adjustable coulter.

3d, The grooved or recessed beam, in combination with the flanged teeth secured thereto, as described.

4th, The forward tooth, provided with the perforated sifter mold board, in combination with a following tooth having the reversed arrangement described, for the purpose set forth.

70,786.—POTATO PLANTERS.—John E. Bendix, New York city, and Morris Dietsch, Westchester, N. Y.

We claim, 1st, A carrier wheel, C, provided at its circumference with cups or buckets, d, in combination with a suitable hopper and tubular seeding stock, substantially as and for the purpose specified.

2d, The lever, J, and vertical holding post, K, arranged and operating in relation with each other, and with the sliding bar, G, of the covering blade, substantially as and for the purpose specified.

3d, The sliding bearing, f, arranged in relation with the shaft which carries the cupped or bucketed carrier wheel or wheels, C, and the gearing connecting the said shaft with the driving axle, whereby the movement of the carrier wheel or wheels, with reference to the hopper and seeding stocks, may be stopped without interfering with the progressive motion of the machine, substantially as herein set forth.

70,787.—ADJUSTABLE WATCH KEYS.—J. S. Birch, New York city.

I claim, 1st, Slitting the barrel, A, of a watch key, diagonally, substantially as herein shown and described, and for the purpose set forth.

2d, Forming the lower part of the barrel, A, cone or pyramid shaped, that is to say, decreasing in size towards the shank or stem, a, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the sleeve or slide, B, and nut, C, one or both, and whether made in one or two pieces, with the slit barrel, A, of the watch key, substantially as herein shown and described, and for the purpose set forth.

70,788.—GRINDING MACHINE FOR CIRCULAR SAWS.—Thos. Birch, Covington, Ky., and Adam Bowden, Cincinnati, Ohio, assignors to Ritter, Hogan and Bowden, Cincinnati, Ohio.

We claim, 1st, The provision, in a machine for grinding circular saws, of a pair of driving friction pulleys, adapted to grasp the saw at a shifting point diametrically opposite, or nearly so, to the point of impact of the grindstone, and having a corresponding approach toward and recession from the saw's center in the act of grinding, substantially as and for the purpose set forth.

2d, The arrangement of the saw carriage and driving pulley carriage, caused to automatically advance and recede with unequal velocities in paths parallel to the grindstone's axis, for the purpose explained.

3d, The arrangement of the paired friction driving pulleys, Z Z', made to grasp the saw on opposite sides thereof by means of pressing springs, b b', and set screws, c c', for the purpose set forth.

4th, In combination with the said friction driving pulleys and accessories, we claim the arrangement of travelling gearing and shaft, Y Y', e e e', and stationary gearing, e'', as represented.

70,789.—BARREL COVER.—Calvin Bird, Dorchester, Mass.

I claim the combination of the flush handle with the strengthening cleat and guard plate, substantially as described.

70,790.—SETTING STEAM BOILERS.—C. T. Boardman, Pawtucket, R. I.

I claim in combination with the cylindrical boilers, B B, tubular boiler, G, and walls, A, of a setting, the pier, H, and horizontal partitions, J J, arranged substantially as specified.

70,791.—GALVANIC BATTERIES.—Charles Boulay (assignor to Jean David Schnaiter), Paris, France.

I claim putting each of the electro motive metals of each element in direct contact with any suitable exciting matters or mixtures of them in the dry or slightly moistened and more or less coarsely pulverized state, which exciting matters or mixtures of them are to act on their respective electro motive metals, or other electro motive bodies embedded in them, by attracting moisture from any suitable exciting liquid or solution, from which they are kept separate by a suitable porous partition or a diaphragm, substantially in the manner and for the purposes described, and illustrated in the annexed drawings.

70,792.—HOUSE VENTILATORS.—Robert Boyd, Evansville, Ind.

I claim, 1st, A ventilator so constructed that pure air may pass into the room, and foul or impure air may be passed therefrom, substantially in the manner herein shown and described.

2d, The outer cylinder, B, with the openings, G, H and J, and the frame, A, combined and arranged substantially as described.

3d, The inner cylinder, C, or its equivalent, arranged and operating substantially as and for the purpose set forth.

70,793.—RAILWAY-AXLE BOX.—C.B. Boynton, St. Paul, Minn.

I claim the arrangement and combination of the rubber, A, under the washer of bolt, B, the inside construction of cover, C, also the flange, E, fitting on to the shoulder at the top of box, D, as herein described and for the purpose set forth.

70,794.—GATE LATCH.—Mark J. Briar, Oxford, Ind.

I claim a latch for gates, etc., composed of latch lever, I, link piece, K, lever handle, L, arranged together substantially as and for the purpose described.

70,795.—SASH FASTENER.—Geo. Brosius, Ranch's Gap, Pa.

I claim the combination of the cam lever, D, spring, E, or its equivalent lever, F, arm, K, bolt, L, and cord, G, in the manner and for the purposes substantially as above set forth and described.

70,796.—APPARATUS FOR DRAWING TIRES FROM ENGINE-DRIVING WHEELS.—Wm. H. Bryant, Chicago, Ill.

I claim the apparatus for drawing tire from wheels, herein described, constructed and operating substantially as her in set forth.

70,797.—CARRIAGE-TOP BUTTON HOLES.—S. A. Budd, Cleveland, O.

I claim the combination of the spring, a, washers, A D, and disk or cap, C, with the curtain, substantially as and for the purpose set forth.

70,798.—HARVESTER.—John Burke, Sycamore, Ill.

I claim, 1st, The combination of slotted plates, F F', provided with notches attached to the front end of gear frame, A, with standard, D, provided with corresponding notches at back end of said gear frame, so that said gear frame may be thus raised or lowered equally at both ends, and parallel with main frame, substantially as set forth.

2d, I claim the combination of slotted plates with rachet, consisting of plates F F', and dogs, G G', substantially as described and for the purpose specified.

3d, I claim the dogs, G G', for the purpose specified.

70,799.—CAR AXLE.—Samuel S. Burt, Marquette, Mich.

I claim the yoke, D, in combination with the axle boxes, C C, axle, B B, and car wheels, A A, substantially as and for the purpose described.

70,800.—AIR ENGINES.—John R. Cameron, Pittsburg, Pa.

I claim, 1st, The combination of the vacuum chamber, A, and the hot air chamber, C, when constructed and arranged as described.

2d, The fire box, B, with its blast pipe, d, and the water cistern, E, in combination with the vacuum chamber, A, constructed and operating substantially as herein set forth.

3d, The inner lining, b', for the purpose of forming more rapidly a vacuum in A, and also the bellows, D, in combination with the vacuum chamber, A, substantially as herein described for the purposes specified.

70,801.—CREEPING ROBES FOR INFANTS.—M. M. Cashman, Boston, Mass.

I claim forming a creeper, by uniting a skirt, A A1 A11, with a wrapper, A1v A111 A11, substantially as shown and for the purpose set forth.

70,802.—ROTARY ENGINES.—Edwin Chapman, Rochester, Minn.

I claim, 1st, The arrangement of the steam chamber, e, aperture, g, and packing, r, with reference to the piston, D, and shaft, E, as herein described for the purpose specified.

2d, The construction of the piston, D, provided with the opening for discharging steam into the cylinder, and opening, f, for exhausting the steam through the shaft, substantially as herein shown and described.

70,803.—MOTOR FOR OPERATING SEWING MACHINES.—Wm. Z. W. Chapman, New York city, H. C. Goodspeed, Plainfield, N. J., and Edwin Reed, Bath, Me.

We claim a sewing machine motor, in which is a barrel enclosing the coiled spring, the equalizing fly wheel, the train of gears, regulating cone pulleys, c c', connected by a band which is operated by a sliding rack and pinion, all constructed and combined as described, and for the purpose set forth.

In combination with the above we claim the brake apparatus, constructed as described and for the purposes set forth.

In like combination we claim the arrangement of the cover of the table, provided with an aperture, which while shut will expose the arm and plate, and when open will neither disturb the machine nor carry any part thereof with it.

70,804.—LEVELING ATTACHMENTS TO AGRICULTURAL IMPLEMENTS MOUNTED ON WHEELS.—Benj. F. Cook, Olema, Cal.

I claim the application of a wheel, F, provided with a rim, a, bevelled so as to form inclined planes, and interposed between the rear axle and bolster of the machine, substantially as and for the purpose set forth.

I also claim the combination of the wheel, F, and the capstan or winch, H, substantially as and for the purpose specified.

I further claim the brake, e, arranged in relation with the drum, dx, of the capstan or winch, H, and connected to the lever, Gx, when said parts are used in combination with the wheel, F, for the purpose set forth.

70,805.—ROOFING.—Geo. Cook, Paris, Ill.

I claim, 1st, A tile, B, of earthenware, stoneware, or other suitable material, having the parts, D E F G H, substantially as shown and described.

2d, In combination with the tile, B, I claim the cap, G, having a groove, g, as and for the purpose set forth.

3d, In combination with the tile, B, I claim the hasp, C c c', as and for the purpose stated.

4th, In combination with the elements, D E F H, I claim the bead, I, and grooved comb, J, for the different sides of the roof peak, as and for the purpose set forth.

70,806.—SILENT BOLT FEEDER.—Jacob Cornwell, Kalamazoo, Mich.

I claim, 1st, The revolving platform, m, provided with scraper, f, in combination with the revolving platform, n, substantially in the manner set forth.

2d, In combination with the subject matter of the above, I claim lever, L, and band, s, substantially as described.

70,807.—LOW WATER DETECTOR.—Clemoire F. Cosfeldt, Jr., Philadelphia, Pa.

I claim, 1st, The arrangement within the boiler of the valve seat, B, support, E, and the independent slotted valve, C D, having shank, b, and rod, d, as and for the purpose described.

2d, The regulating screw, d, one end protruding through the slot, c, and the other end resting on the support, E, substantially as and for the purpose described.

70,808.—CLOTHES WRINGER.—E. Hall Covel, New York city.

I claim, 1st, The double slotted standards, A A, in combination with the conical box, N, and levers, H H, substantially as and for the purpose herein recited.

2d, The double bail or semi-circular levers, H H, jointed together, and forming thereby a fulcrum for each other, with the boxes, N, attached thereto, or cast theron, and having the springs and adjustable nut on the ends, as and for the purpose described.

70,809.—APPARATUS FOR CARBURETING AIR.—William F. Cozzens and J. H. Jones (assignors to themselves and Leopold Bouvier), St. Louis, Mo.

We claim, 1st, The combination of the condensing or forcing apparatus, A, with the carbureter, B substantially as set forth.

2d, The combination of the trays, B2 and B3, and the injection pipes, b5 and apertures b4, when arranged as and for the purposes set forth.

70,810.—CHEESE PRESS.—E. J. Crane, Laporte, Ind.

I claim the platform, A, the studs, B B' and C, the connecting bar, E, the levers, D D', the pressing stud, F, and the table, G, arranged, combined and operating substantially as shown and described for the purposes herein set forth.

70,811.—CONSTRUCTION OF SHEET METAL BOXES.—Martin H. Crane (assignor to Crane, Breed & Co.), Cincinnati, O.

I claim the mode of stiffening and ornamenting vessels made of sheet metal by the use of composite ribs or mouldings of wood and metal, soldered to the exterior or interior surface of the vessel, substantially as set forth.

70,812.—VENTILATING DEVICE FOR RAILROAD CARS.—Wm. G. Creamer, Brooklyn, N. Y.

I claim the construction and attachment of ventilating plates to the sides of railroad cars, to admit air and exclude rain and cinders, and present a plain surface, substantially as specified.

70,813.—BOAT HOISTING APPARATUS.—A. F. Crosman, Steamer Osmpee, U. S. N.

I claim, 1st, The drums, D D, upon the shaft, E, secured to the side of the vessel between the davits, and provided with a rope, G, passing through the side of the vessel, all arranged as described, whereby the manipulations of the rope, G, operate the tackle ropes, a a, simultaneously, as herein shown and described.

2d, The arrangement of the links, J K, hooks, L, metallic mountings, M, hooks, N, and vertically sliding bar, f, for detaching the boat from the tackle blocks, as herein shown and described.

70,814.—METHOD OF STARTING AND STOPPING CARS.—Alonzo G. Crossman, Huntington, N. Y.

I claim, 1st, The cylinder, L, and piston, K, in combination with the wheels, D, E and F, and suitable connections, the whole operating in conjunction with the axle, G, substantially as set forth.

3d, The combination with the cylinder, L, piston, K, and wheels, D, E and F, of the clutches, a and b, substantially as and for the purpose specified.

3d, The combination, with the piston, K, and cylinder, L, of the rack, R, spur wheel, S, and crank, T, substantially as and for the purpose set forth.

70,815.—FAUCET FOR STOVE RESERVOIRS.—John B. Crowley (assignor to himself and Chamberlain & Co.), Cincinnati, O.

I claim, 1st, The provision, in a stove reservoir, or boiler, of the spout, B, having within the reservoir a plug or valve, D, whose stem extends and is operated above the top of the reservoir, substantially as and for the purpose set forth.

2d, The arrangement in a stove reservoir of the spout, B, having within the reservoir the upturned seat or inlet, C, and self-closing valve or plug, D, whose stem or handle extends through an orifice, e, in the reservoir lid, and is confined in lugs or guides, G H, substantially as set forth.

70,816.—CORN HARVESTER.—John P. Culp, Quincy, Ill.

I claim, 1st, The wheels, D E F H I', the shipper, G, cutter, K, and reel, L, arranged as described, in combination with the sustaining wheels, B, and shaft, a, of a corn cutting machine, as set forth.

2d, The jointed arms, c c, in combination with the cutter, K, and reel, L, arranged and operating substantially as and for the purpose set forth.

3d, The combination of the latch, O, and the trap-falls, N N N', in the bed of a corn cutting machine, when arranged and operating substantially in the manner and for the purpose described.

4th, The roller, P, with its arm, l', and the latch, m, when combined with the frame and bed of a corn cutting machine, and arranged and operated substantially as and for the purpose set forth.

70,817.—ASH SIFTER.—J. Warren Custer, Trappe, Pa.

I claim the arrangement of the wire sieve, D, having a wire around its circumference, when secured within a circular box, A, by means of the jaws, E E, formed in said box, and the spring, G, in the manner and for the purposes set forth.

70,818.—SASH SUPPORTER AND FASTENER.—Amos Cutter, East Boston, Mass.

I claim the combination of the arms carrying the rollers or wheels holder, F, and thumb screw, G, or its equivalent, substantially as and for the purpose described.

70,819.—GATES.—Orlean Doud (assignor to himself and Isaiah Rowe), Dansville, New York.

I claim, 1st, The combination of the rail, A', with the pin, b, and post, B', with cap, a, and metal plate, C, with the gate, A, having a segmental bar, D, all constructed, arranged and operating in the manner and for the purposes set forth.

2d, The latches, d d, rod, l, lever, e, spring, g, used in connection with the gate, A, and post, B, with its pins, x x, for the purposes set forth.

70,820.—CAPSTANS.—Jacob Edson, Boston, Mass.

I claim, 1st, Constructing the base of two cone-shaped disks, or sheils, one of which is reversed so as to give double bearings, B B, and B' B', for the standard or spindle, H.

2d, The unguent receptacle at the top of the base, and surrounding the standard or spindle, H, made substantially as and for the purpose set forth.

3d, The extending of the fleeting cleats above the joint which separates the head from the body of the capstan, substantially as described and for the purpose set forth.

4th, Combining with the body of the capstan the head and cap, N, made in one piece, substantially as and for the purpose set forth.

5th, In placing the upper bearing of the capstan in the top of the cap or head, N, substantially as and for the purpose set forth.

6th, The combination of the draining pipes, L L, with the receptacles, K K, substantially as described and for the purpose set forth.

70,821.—WHEEL BARROW.—David B. Ellis, Ypsilanti, Mich.

I claim the diagonal brace, bracing and strengthening both the body and legs of the barrow against lateral and perpendicular strain and pressure, substantially as described.

70,822.—MARBLE SHOOTER.—Wm. F. Falls, Boston, assignor to Ira Steward, Milford, Mass.

I claim a marble shooter having its parts constructed and arranged to operate and adapted to the projection of marbles of varying size, substantially as set forth.

70,823.—DOOR HOLDER.—C. J. Fisher, Waukon, Iowa.

I claim the combination of the cam lever, E, frames or plates, B and C, and bumper, F, with each other, substantially as herein shown and described and for the purposes set forth.

70,824.—CROOK FOR MUSICAL INSTRUMENTS.—Isaac Fiske, Worcester, Mass.

I claim a crook for musical instruments made of one piece of metal and formed into shape substantially as set forth.

70,825.—WORK BOX.—James S. Fletcher, South Bend, Ind.

I claim a revolving or turning work box with apartments within it for containing sewing articles accessible as set forth, and constructed as described and represented, out of solid rings, C c, as set forth and explained.

70,826.—COMPOSITION FOR COATING SHIPS' BOTTOMS.—Geo. A. F. Fowke, Westminster, Great Britain.

I claim the composition, in its forms, I. II. and III, and in its application and use, as hereinbefore in this specification described, for the purpose of coating the bottoms of iron and wooden ships, floating docks, and other similar structures and submarine works, and thereby preventing them from fouling and the ravages of the worm.

70,827.—SLEIGH BRAKE.—C. Gardiner, Esperance, N. Y.

I claim, 1st, The pawls, G, their upper ends wedge shaped and pivoted in the corresponding wedge-shaped mortice in the bent lever, E, whereby the pawl is permitted to yield to the backward movement of the sleigh, all arranged and constructed as herein set forth for the purpose specified.

2d, The connecting rod, e, embracing the bar, A', and the tongue, A'', connected by the pin working in the slot in the tongue, its lower part extending to the neck yoke, all constructed and arranged as described, in such a manner that the length of the stroke of the pawl, G, shall be governed by the length of the slot in the tongue, as herein set forth for the purpose specified.

70,828.—RAILROAD GATE.—E. K. Gardner, Orville, Ohio.

I claim the gates, D D, levers, m m and n n, arms, i i, and movable rails, C C, all combined substantially in the manner and for the purpose set forth.

70,829.—CAR COUPLING.—Samuel Gissinger, Lawrenceville, Pa.

I claim the pivoted buffer, A, provided with link opening, O, pin opening, 2, plate, R, and locking pin, f, when used in combination with lever, g and r, chain, m, and springs, n and s, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

70,830.—TOOL REST.—Wm. Gleason, Rochester, N. Y.

I claim, 1st, The employment of the triple screw system, substantially as herein set forth, for the purpose of adjusting vertically the cutting tool of engine lathes without loosening it.

2d, The arrangement of the eccentric clamping shaft, Y, in connection with the clamping screw, S, and rest, D, substantially in the manner herein shown and described and for the purpose set forth.

70,831.—METAMORPHOSCOPE.—E. A. Goodes (assignor to himself, E. L. Miller, and W. H. Morford), Philadelphia, Pa.

I claim, 1st, The combination of two or more endless belts of different lengths, furnished with sections of figures or pictures, substantially as and for the purpose specified.

2d, The combination of the endless belts furnished with sections of figures or pictures, the rollers, A' a b c, and the top plate or cover, e, formed with an opening, f, substantially as and for the purpose specified.

70,832.—TRAVELING BAGS AND VALISES.—Nicholas Groel, Newark, N. J.

I claim as an article of manufacture the struck-up metallic corner pieces, D, when constructed and applied in the manner described to valises and traveling bags, for the purpose specified.

70,833.—DRYING ATTACHMENT FOR PAPER RULING MACHINES.—R. J. Groshans, Buffalo, N. Y.

I claim, 1st, The application of a revolving fan to paper ruling machines for the purpose of drying the paper, and causing the same to be discharged smoothly into the box prepared to receive it, substantially as set forth.

2d, The manner of constructing the fan, substantially as shown and described, to wit, having the fan composed of pasteboard, tar-board, or an equivalent material fitted on pins, c, in the shaft, and retained in position by springs, B, substantially as shown and described.

70,834.—TAG HOLDER.—A. Grushus, St. Paul, Minn.

I claim the tag holder made substantially as herein described.

70,835.—TREADLE FOR SEWING MACHINES.—Thomas J. Halligan, New York city.

I claim, 1st, The construction and arrangement, substantially as herein described, of the treadle shafts, C D, with their treadles, A B, for operation in unison and whereby said shafts are made the one to support and protect the other, essentially as herein set forth.

2d, The combination of the treadle shafts, C D, arranged as described, with their treadles, A B, driving arms or levers, E F, pitmen, G H, and double-throw crank, I, of or to the revolving shaft, K, substantially as shown and described.

70,836.—STOVEPIPE DAMPER.—Griffen B. Halsted, N. Y. city.

I claim, 1st, The notched friction ring, in combination with the spurred shaft of the damper, substantially as and for the purpose specified.

2d, The friction ring constructed with a cam-like surface, whereby the compression of the pipe may be increased by turning the friction ring with reference to the damper shaft, substantially as and for the purpose specified.

3d, The damper, B, constructed with the angular groove, e, and the lips, f, arranged in relation with each other substantially as described, whereby the damper may be readily attached to its spurred shaft, as set forth.

70,837.—LOOM.—Marion McDonald Hankins, Vandalia, Ill.

I claim, 1st, The combination of the straps, C C, and rollers, D E, for operation substantially as specified, to work the pickers by the action of the lay.

2d, The arrangement of the picker levers, B B, constructed as described, springs, F, or their equivalents, and the lay, substantially as herein set forth.

3d, In combination with the levers, B B, the connecting straps, G G, rollers b pickers, H H, and check straps, I I, for operation with each other and the lay, as shown and described.

4th, The means, substantially as herein described, for operating the treadle roller, T, consisting of rods, J J, lever, K, shaft, L, spring, N, rod, O, and clutch and lever, Q P, essentially as specified.

70,838.—MEDICAL COMPOUND.—John Harrigan, East Boston, Mass.

I claim the above described medicine, compounded as described and for the purpose set forth.

70,839.—AMALGAMATOR.—F. G. Hesse, San Francisco, Cal.

I claim, 1st, The narrow annular amalgamating chamber, A, formed by a revolving cylinder, D, and an inner cylinder, either stationary or revolving with D, constructed for very high speed, and in combination with a hydraulic device to cause a current of air to pass through said chamber, for the purpose substantially as described.

2d, The use of an extra current within the chamber, A, for the purpose of discharging pulp without interfering with the amalgamating current, substantially as described.

3d, The manner of producing this current by means of a centrifugal head and guide blades, substantially as described.

70,840.—PENCIL HOLDER FOR COMPASSES.—Wm. G. Hillegass, Philadelphia, Pa.

I claim the removable pencil holding attachment for carpenters compasses the same consisting of the clamp, B, made adjustable by a set screw, c, substantially as and for the purpose herein shown and described.

70,841.—STEAM ENGINE.—John M. Hirlinger, Red Rock, Pa.

I claim slide, H, as constructed, in combination with the slotted cylinder, the bolt or shaft, G, and the piston, B, for operating the valve, D, by means of its pin, E, extending into a recess in said piston, in the manner substantially as and for the purposes specified.

70,842.—PUMP.—John M. Hirlinger, Red Rock, Pa.

I claim the slide valves, a and d, constructed as described, in combination with the stock and piston, arranged as and for the purpose specified.

70,843.—MENSTRUAL RECEIVER.—S. L. Hockert, Chicago, Ill., assignor to himself and Jared Thompson, Sr., Milwaukee, Wis.

I claim the construction and combination of ring, a, sack, b, and arm, c, for the purposes and in the manner substantially as hereinbefore shown.

I also claim the combination of ring, a, sack, b, arm, c, and cord, for the purposes and in the manner as hereinbefore set forth, or their equivalent.

I also claim a combination of ring, a, sack, b, arm, c, cord, i, pad, e, projection, a, set screw, d, belt, f f, and buckle, g, for the purpose and in the manner hereinbefore set forth.

70 844.—TUBE WELLS.—D. Cyrus Holdridge, Lodi, Wis.

I claim the tubular point, B, and screw, f, in combination with the pipe, A, when arranged to operate as described and for the purpose set forth.

70,845.—MACHINE FOR MAKING THE LINKS FOR CABLES AND OTHER CHAINS.—Alfred Homfray, Witley Lodge, England.

I claim, 1st, The sliding shaft or ram, and mandrel which it carries, in combination with the anvil and the jaws for holding the link, and tappets for closing said jaws, substantially as and for the purposes herein shown and described.

2d, The combination with the sliding shaft or ram and its mandrel, of the welding ram or hammer and die, arranged and mounted in the frame of the machine, substantially as and for the purposes set forth.

3d, The combination of the mandrel, its shaft, and the welding hammer and die, with the anvil, link-holding jaws, and tappets by which said jaws are closed, substantially as herein shown and specified.

70,846.—DOOR FASTENING.—Nelson Hornaday, West Elkton, Ohio.

I claim the combination of hooks, A A C, bar, B, with the catches, D E O, when the several parts are constructed, arranged, and operating conjointly in the manner and for the purpose specified.

70,847.—MOLDING-FACING MACHINE.—Robert Howdon (assignor to Crane, Breed & Co.), Cincinnati, Ohio.

I claim, 1st, The construction of the dies of a molding facing machine in two or more adjustable parts, for the purpose set forth.

2d, The arrangement of frame, A, movable dies, C C' C'', and set screws, D, or their equivalents, for the purpose set forth.

3d, The auxiliary die, I I, in the described combination with the rear die C, of a two or more part molding-facing apparatus, for the purpose explained.

70,848.—SELF-ADJUSTING THILLS.—Arah H. Howe, Brookfield, Vt.

I claim, 1st, The independent shafts, B B, connected together by the strap, C, and to axle, A, by means of the rod, a, whereby one of said shafts may be used independent of the other, as specified.

2d, The arrangement of the shafts, B B, low-draft whiffle, D, rods, a a, and connecting straps, in the manner substantially as and for the purposes set forth.

70,849.—MACHINE FOR FILLING MARSHES.—George Howell, Philadelphia, Pa.

I claim, 1st, An excavating boat constructed for partial and varied submergence, having the chamber, B, pipe, G, side plate, a, and with or without the inner plates, J, substantially as described and for the purpose set forth.

2d, In combination with such a boat, I claim the air-tight reservoirs and pipes connected therewith, substantially as and for the purpose set forth.

3d, I claim in combination with such a boat, the strrers, e, on the shafts, F, substantially in the manner described and for the purpose specified.

70,850.—AUTOMATIC TIGHT-ROPE DANCER.—Wm. Humans (assignor to himself and Charles Williams, Jr.), Boston, Mass.

I claim, 1st, A jointed figure, balanced as shown, in combination with a pulley wheel, c, provided with cranks or arms, d, through which motion is imparted to the legs of the figure as the pulley passes over a cord, on which it is supported, substantially as de-cribed.

2d, I claim the combination of the hinged arm or detent, e, and cord, g, or its equivalent, attached to the arm of the figure, substantially as and for the purpose set forth.

70,851.—PADDLE WHEEL.—Wm. Hunter, Detroit, Mich.

I claim a paddle wheel constructed with radial arms, B, and floats, D, which are rigidly attached to the end of one arm, and, extending in front thereof, are secured on the opposite edge of the next preceding arm, or to the rim, C, in such manner as to form an acute angle at its upper edge, and form a diagonal bracing for the arms, substantially as described.

70,852.—PAPER FLOUR SACK.—John M. Hurd, Auburn, N.Y.

I claim, 1st, Crimping or softening a strip or band around near the top of the paper flour sack, as and for the purpose specified.

2d, The combination of the plain rolls, G H, or their equivalents, with two or more sets of crimping rolls, when all are used for the purpose above specified.

70,853.—REEL AND SWIFT.—Ezra Hutson, Brockport, N. Y.

I claim, 1st, The sleeve, C, in combination with the pivoted arm, B, substantially as and for the purpose specified.

2d The combination of plates, k K', arms, D D, sleeve, C, and arm, B, as and for the purpose set forth.

3d, Spring, f, wheel, d, sleeve, C, and arm, B, all combined substantially in the manner and for the purpose described.

70,854.—SHRINKING TIRE.—J. B. Jackson and M. R. Jackson, Rochester, Iowa.

We claim the stationary jaw, C, and movable jaw, D, in combination with the screw, F, gripes, G, and keys, H, constructed and arranged to operate substantially as and for the purpose set forth.

70,855.—YOKE FOR GRAIN ELEVATORS.—Eliza Jane Jewell, Brooklyn, N. Y., administratrix of the estate of T. E. Jewell, deceased.

I claim, 1st, Making the yokes of grain elevators of cast iron, constructed substantially as and for the purpose herein shown and described.

2d, The adjustable guide arrangement at the ends of a metal yoke, when consisting of the flanges, c, plates, e, gibs or guides, f, and set screws, g, all made and operating substantially as described, in combination with the tenons, b, on the uprights of the stationary frame, A, arranged as described.

70,856.—LAMP.—Melvin Jincks, Dansville, N. Y.

I claim the employment of a gas tube which shall extend from the mouth of the wick tube to the first floor of the shell, for the purpose of retaining and consuming the gas generated in the lamp, when arranged in combination with non-conductor, B, shell, A, and extinguisher, E, as herein set forth and described.

70,857.—COMPOUND TOOL FOR PUNCHING AND SHEARING.—J. C. Jordan, Watertown, Wis.

I claim the combination of the frame, A, lever, C, cogged segment, D, pinion, E, handle, F, shears, B G, cam, H, box, L, mandrel, I, punch, M, and die, f, all arranged and operating substantially as herein described and represented.

70,858.—FIREPLACE.—Israel Kepler, Corry, Pa.

I claim in connection with the common corrugated grate back, the corrugated extension plate or back, H, projecting over the fire and continuing up to the throat of the flue, as and for the purpose herein described and represented.

70,859.—SHEEP TROUGH.—Frank Ketcham, Monongahela City, Pa.

I claim the sheep trough of the form and configuration substantially as and for the purposes herein shown and described.

70,860.—DOOR LATCH.—Edward King, Taunton, Mass.

I claim the combination of the hub, F, to knob spindle, having extension arm, H, in combination with a latch bolt carrying pawl, I, when all arranged together for operation substantially as and for the purpose described.

70,861.—SHEEP SHEARS.—Brainerd Kingsley, Sharon, Mich.

I claim 1st, The bands, G G, and handle, I, arranged to hold and operate cutters, J, substantially as set forth.

2d, The combination of cutters, J J, and m m m, with levers, B C, bar, A, bands, G, and handle, I, as set forth.

3d, The plate, E', bar, a, posts D and E, arranged to support bands, G G, and lever, C, substantially as described.

70,862.—NUT-TAPPING MACHINE.—Jas. Kirkley, Chicago, Ill.

I claim 1st, The arrangement of a gang of die boxes, a gang of taps, a gang of rotating and vertically sliding spindles, in the relation shown to gears, and a shaft, O, the parts above named being constructed and operated substantially as herein described.

2d, The arrangements of the oil receiver, G, oil-supply reservoir, F, pipes, d e, and forcing-pump, s, in combination with the die bed and vertically sliding and rotating spindle carrying taps, substantially in the manner and for the purpose herein described.

3d, The combination, with the nut tapping machine, constructed and operating substantially as herein described, of an automatic lubricating and oil-elevating apparatus, constructed and operating substantially as herein described.

4th, The arrangement of the levers, R, weight, W, links, R', treadles, S, and vertically-sliding and horizontally-rotating spindles, carrying taps, H, in relation to one another and to the die-bed, D, substantially in the manner and for the purpose described.

70,863.—MACHINE FOR CUTTING PAPER STOCK.—Abijah L. Knight, Baltimore, Md.

I claim 1st, The combination of the crank shaft, G, pitman, F F, knife-block H, guide-frame, I, and knives, i and C, substantially as and for the purpose specified.

2d, The combination of the crank shaft, G, pitman, F, having the pin, e, lever, L, pawl, p, ratchet, r, idle-wheels, O and P, feed-rollers, M, M', N N', and feed-table, P, all constructed and arranged substantially as and for the purpose set forth.

3d, The paper-stock cutting machine above described, consisting of the parts specified in clauses one and two of this claim, combined and arranged together substantially as described, for the purpose of cutting and preparing paper stock.

70,864.—MACHINE FOR MOLDING PULLEYS.—Thos. Knowles, Robert Knowles, and Samuel Knowles, Jersey city, N. J.

We claim a machine or apparatus for molding wheels or other work of curvilinear character, having for its elements a pillar or post, A, horizontally swinging and radially adjustable ram, D, carrying a vertically adjustible ram or pattern-holder, I, and dividing gear for adjusting the swing of the horizontal ram, substantially as specified.

70,865.—COMPOSITOR'S COPY HOLDER.—P. A. La France, Elmira, N. Y. assignor to himself and H. R. Kendall, New York city.

I claim 1st, The board, A, when provided with the extension, b, and roller, c, or their equivalents, and with the spring finger-bar, C, for holding the manuscript, substantially as and for the purpose herein shown and described.

2d, The board, A, when provided with the extension, e, or its equivalent, and with the indicating sliding bar, D, substantially as and for the purpose herein shown and described.

3d, The board, A, when provided with grooves, h h, or their equivalents, and with slotted plate or plates, E, or their equivalents, substantially as herein shown and described.

4th, The board, A, when arranged as described, so that it can be moved laterally on the type-case, B, and when provided with the spring finger-bar, C, sliding indicator-bar, D, and extension bars, E, or equivalents, all made and operating substantially as and for the purpose herein shown and described.

70,866.—BOLT FASTENING.—V. Lapham, El Paso, Ill.

I claim the bolt fastening, D, formed by the combination of the hinged parts, d1 and d2, pivoted catch, d3, and rubber spring, d4, or equivalent, with each other and with the bolt, C, substantially as herein shown and described and for the purpose set forth.

70,867.—LAMP.—James Lee, New York city.

I claim 1st, The combination of the wooden case, B, with the oil reservoir, A, substantially as herein shown and described and for the purpose set forth.

2d, The interposition of a wooden connection, b2, between the neck, a', of the oil reservoir, A, and the cap, C, substantially as herein shown and described and for the purpose set forth.

3d, Forming air passages, D, in the neck of the lamp, leading beneath the cap, C, from the external air to the interior of the oil reservoir, A, substantially as herein shown and described and for the purpose set forth.

4th, The adjustable extension pedestal, formed by the combination of the parts F and G, springs, f, and stop, g', with each other, and with the case, B, substantially in the manner herein shown and described, and for the purpose set forth.

70,868.—FISHHOOK.—A. I. Lenhart, New Brunswick N. J.

I claim the hook, B, pivoted to the bar, A, provided with the shoulder, b, and having the spring, d, bearing against it, in connection with the slide, c, having the spring, D, attached, and the hook or hooks, C, all arranged substantially as and for the purpose set forth.

70,869.—SHAFT COUPLING.—W. E. London, (assignor to J. A. Fay & Co., Cincinnati, Ohio.

I claim a shaft coupling, constructed as herein specified, to wit: one half keyed on firmly in the usual manner, the other half provided with an adjustable clamping device, as herein specified and for the purposes described.

70,870.—HORSE RAKE AND HAY SPREADER COMBINED.—J. M. Low, Portlandville, N. Y.

I claim 1st, The arrangement of the revolving toothed shaft, M, and its supporting frame, K, the axle, A, and frame, C, of the rake substantially as herein shown and described and for the purpose set forth.

2d, The combination of the gear wheels, E and O, shaft, P, gear wheels, Q, and R, one or more shafts, S, and the gear wheels, T and U, with each other, and with the drive wheels, B, frame, K, and tedder-shaft, M, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the toothed reciprocating clearer shaft, B', with the revolving toothed tedder-shaft, M, and with the frame, K, substantially as herein shown and described and for the purpose set forth.

4th, Operating the reciprocating clearer shaft, B', from the shaft, P, by means of the eccentric wheel, E', or its equivalent, and the pitman, D', substantially as herein shown and described and for the purpose set forth.

70,871.—QUILTING FRAME AND CLOTHES DRYER.—Geo. A. Mallory, and J. J. Fish, Oxford, New York.

We claim the adjustable slotted standards, A A, cross-rail, B, arms, C C, and cross-rods, g g, constructed and arranged to serve as a quilting frame and clothes horse combined, substantially as described.

70,782.—PREPARING WOOD TO BE USED IN THE MANUFACTURE OF PAPER AND FOR OTHER PURPOSES.—C. K. Marshall, New Orleans, La.

I claim 1st, As a new article of manufacture and commerce, wood chips and saw-dust, reduced to a fine flour or powder, substantially as described.

2d, The use of the flour, obtained as above described, as an ingredient in the manufacture of paper.

70,873.—FURNACE FOR DESULPHURIZING AND REDUCING ORES.—Jabez Maunton, (assignor to himself and Wright Duryea, Wm. Ennis, J. H. Van Riper, A. P. Cummings, and J. Wendell Cole), New York city.

I claim 1st, The combination with a reversible draft in or through them, essentially as specified, of the fuel chambers, E E, and intermediate reducing chamber, F, said chambers being chargeable from above, and communicating with each other at or near the base, substantially as and for the purpose or purposes specified.

2d, The combination with a reversible draft, operating as described of regenerators, D D, fuel chambers, E E, and intermediate reducing chamber, F, said fuel and reducing chambers connecting with each other at or near the base, and chargeable from above, essentially as herein set forth.

3d, The vertical regenerators, D D, with their draft inlets or outlets, e, arranged below, in combination with the fuel chambers, E E, and intermediate reducing chamber, F, for action as described.

4th, In combination with the vertical regenerators, the spray water pipes, K, essentially as and for the purpose specified.

70,784.—FURNACE FOR HEATING PURPOSES.—Jabez Maunton, (assignor to himself, Wright Duryea, Wm. Ennis, J. H. Van Riper, A. P. Cummings, and J. Wendell Cole, New York city.

I claim the combination of the fuel chamber, C C', arranged to connect for combustion at the base, and regenerators, F F', in connection with said chambers at or near their tops, for operation with a reversible draft substantially as specified.

70,875.—RAILWAY SUPERSTRUCTURE.—J. Audley Maxwell, Savannah, Ga.

I claim in the construction and arrangement of the superstructure of railroads, the combination of the ties, A A and B, string pieces, C, chair, H, and knees, K, in the manner and for the purpose herein described.

77,876.—MACHINE FOR PLANING METALS.—Wm. McPherson, New York city.

I claim 1st, The cross-traversing screw, G, or its equivalent, and driving gear, as herein specified, so arranged to the cross-cutting tool in a planing machine as to operate relatively to the cutting tool, A, and table, W, substantially in the manner and for the purpose herein specified.

2d, I claim in combination with the longitudinal and transeverse feeding mechanism of the planer, the adjustable uprights, E E, arranged to operate substantially as and for the purposes herein set forth.

3d, The hinged braces, 2 and 4, in line with the axis of and in combination with the adjustable inclined uprights, E, and bed of the planer, substantially as and for the purposes herein specified.

70,877.—HAND LOOM.—S. C. Mendenhall, Richmond, Ind.

I claim 1st, The application to hand looms of the endless metal-eyed belt or metallic chain, B b, in combination with the sparred pulleys, C, D, the whole being arranged and combind for the purpose of driving the cam shaft, A.

2d, The described arrangement of endless metal-eyed belt or metallic chain, B b, sparred pulleys, C and D, pitmen, P P, and batten, Q.

3d, The described arrangement of the endless metal-eyed belt or metallic chains, B b, sparred pulleys, C and D, pitman, P P, and batten, Q, and the crank, D', when said crank has such a position on its pulley as to give and time the motions of the batten, and the cam shaft, A, and for the purposes set forth.

4th, I claim the reversible plate, S, with its slot, u, or its equivalent, for the purposes set forth and described.

70,878.—BLEACHING STOCK FOR PAPER.—S. T. Merrill, Beloit, Wis.

I claim the introduction into a close-covered rag engine or other close vessel, provided with an agitator, of chlorine gas, or the disengaging of the latter from a chlorine solution contained within the box of the engine or other vessel, for the purpose of bleaching paper stock, substantially as set forth.

70,879.—SLIDE FOR EXTENSION TABLE.—Elisha Mets, (assignor to himself and A. Cram), Rochester, N. Y.

I claim in combination with the oblique grooves, substantially as herein shown and described, the bent coupling or locking irons, h, for the purposes set forth.

70,880.—AWNING.—S. Miller, and J. S. McClellan, Champaign County, Ohio.

We claim 1st, The two rollers, B B, in combination with rolls, F, canvas, H, arms, G, boards, K K, and cord, I, constructed and operating as described, and for the purposes set forth.

2d, The arranging boards, K K, so as to form a shelter to roller, F, in combination with rollers, F, canvas, H, arms, G, boards, K K, and cord, I, constructed and operating as described, and for the purposes set forth.

70,881.—MACHINE FOR TEMPERING SKIRT WIRE.—J. H. Monk Brooklyn, N. Y.

I claim a pair of grooved rollers, adjusted substantially as specified, in combination with the pot or bath for melted metal for tempering wire for skirts, etc., in the manner set forth.

70,882.—WASHING MACHINE.—Allan Neilson, Allegheny City, Pa.

I claim, 1st, The corrugated conical rollers, E, when arranged with level lower surfaces and when secured to a swinging frame, C, the axes of which rollers cross each other, substantially as and for the purpose herein shown and described.

2d, The flexible washboard, G, consisting of laths that are secured together by strings or wires, a a, operated by a treadle, F, substantially as set forth.

3d, The combination of the treadle, F, cords, a, box, H, and flexible board, G, with each other and with the rollers, E, all made and operating substantially as herein shown and described.

70,883.—DISH WASHER.—Edwin Norton and J. S. B. Norton, Boston, Mass.

We claim the combination as well as the arrangement of the revolving frame, E E', with the crib, K K, made substantially as described and for the purpose set forth.

70,884.—HOOK FOR TRAVELLERS.—William R. Oatley, Rochester, N. Y.

I claim the two hooks, A B, connected by a swivel joint, and constructed and arranged substantially in the manner as and for the purpose set forth.

70,885.—FANNING MILL, GRAIN AND SEED SEPARATOR.—Harrison Ogborn, Richmond, Ind.

I claim, 1st, The trough, 13, situated under and at the lower end of the upper grain board with a removable side, 15, substantially as and for the purposes described.

2d, The combination of the adjustable trough, 13, with the upper grain board, 11, forming the bottom of the front part of the shoe, I, and the adjustable screen, J, substantially as and for the purposes described.

3d, The combination of the upper grain board, 11, with the adjustable side, 12, of the trough, 13, substantially as and for the purposes described.

4th, A hopper consisting of the side boards, E, with converging grooves, s, the sliding board, F, and adjustable swinging board, H, substantially as and for the purposes described.

5th, The combination of the swinging board, H, lever, E, provided with a spur or tooth, e1, and the rack, e2, substantially as and for the purposes described.

6th, The vertical circular rim, R, secured to the fanning, Q, substantially as and for the purposes described.

7th, The rod, p, with its bent part, p', and the lever, n, substantially as and for the purposes described.

8th, The rod, p, in combination with the linked rods, m and m', wrist, v, and wheel, V substantially as and for the purposes described.

9th, The belt wheel, W, pivoted loosely on the pin, w, and provided with three sets of holes, K K1 and K2, for the purpose of giving either circular, side or end motion to the shoe, substantially as and for the purposes described.

10th, The arm, l, rigidly attached to the shoe by means of which motion is transmitted to the shoe, substantially as and for the purposes described.

11th, The combination of the arm, l, rigidly attached to the shoe, pulleys, V W, and belt to give circular motion to the shoe, substantially as and for the purposes described.

12th, The combination of the arm, l, pulleys, V W, and rod, r', to give either side or end motion to the shoe, substantially as and for the purposes described.

13th, The pins, g2, on the cleats of the sliding doors, G', substantially as and for the purposes described.

70,886.—RAILWAY CHAIR.—Nathaniel F. Page (assignor to himself and Elijah Whitney), Rutland, Vt.

I claim as my invention the combination as well as the arrangement of the cap, C, with the part, A, made with the two lips, a b, to receive the rail and the cap, substantially as specified.

I also claim the arrangement of the recess of the lip, b, at an obtuse angle with the rail-supporting surface of the chair, such chair being provided with two lips, a b, and a cap, C, as set forth.

70,887.—CARD HOLDER FOR TRUNKS.—William L. Paine, Boston, Mass.

I claim the within-described card holder for trunks consisting of the strips or plates, B C, in combination with points or projections, or their equivalent, for holding the card securely in place, substantially as set forth.

79,888.—FRICTION CLUTCH PULLEY.—C. D. Palmiter (assignor to S. A. Webb), Oswego, N. Y.

I claim, 1st, The device herein shown and described of connecting the pulley, B, with the shaft, A, consisting of a movable wedge, l, and an eccentric pivoted friction pad, j, which are made and operated substantially in the manner herein shown and described.

2d, The hinged lever, C, spring, h, stationary arm, C, and sliding wedge, l, in combination with each other and with the shaft, A, and pulley B, all made and operating substantially as herein shown and described.

3d, The combination and arrangement of the arm, C, having arm, d, elbow-shaped bar, D, pivoted thereto, and having the arms, f g, and pad, j, spring, h, set screw, i, wedge, l, sliding sleeve, E, pulley, B, and shaft, A, as herein described for the purpose specified.

4th, The pad, j, when attached to the arm, D, at the point of connection of the arm, f g, and out of line with the axis, A a, whereby the revolutions of the pulley, B, in one direction clamps the edge of the pad in line with the axis, A a, and increases its bite, and the revolutions of the pulley in the opposite direction turn the pad out of the line of said axis and releases its bite, as herein described for the purpose specified.

70,889.—BLACKING BRUSH.—Charles A. Parot, Nashville, Tenn.

I claim the arrangement of the staples, D D, loop, F, elastic band, R, scraper, B, spring, C, and groove brush stock, A, as herein described for the purpose specified.

70,890.—ASH SIFTER.—Daniel E. Paris, Troy, N. Y. city.

I claim, 1st, A ball to an ash sifter used separately from an ash pan or constructed with hooks or lugs at either end of the ball so as to engage with an ash pan surrounding or inclosing the sifter and so that both sifter and pan can be moved by the ball or the sifter separately.

2d, A double self-acting lifter to an ash pan or ash sifter so constructed with hooks or other means of moving the pan or sifter but not attached or attachable to them except while in actual use or in vertical position, as herein described and explained.

70,891.—STRAW CUTTER.—Hiram Parks, Athens, N. Y.

I claim the notched feed bar, K, when provided at its front with teeth in combination with the pin, b, on the oscillating lever, I, all made and operating substantially as herein shown and described.

70,892.—BLACKING BOX HOLDER.—Thomas King Payson, New York city.

I claim the box holder, A, with its lid carrier, B, provided with set screws, f, or other equivalent means for securing the box and its lid and setting the same relatively to each other, also facilitating the accommodation of different sized boxes in the one holder, substantially as shown and described.

70,893.—INKSTAND.—Stephen Perry and Joseph John Perry, London, England.

We claim, 1st, The employment of a hollow stopper formed of vulcanized India-rubber, or other suitable elastic material, in combination with the reservoir, A, tube, D, and cup, D1, for the purpose and substantially in the manner set forth.

2d, The tube, D, formed with the protuberance, D2, and fitted into the stopper, C, for the purpose and substantially in the manner set forth.

3d, Forming a stopper, cup and tube, in one piece of hard and soft rubber combined, substantially as described.

70,894.—EDGE PLANE.—J. E. Plummer, Binghamton, N. Y.

I claim the construction and use of a "reversible edge plane," substantially as described and represented for the purpose set forth.

70,895.—BOLT FOR DOOR.—George A. Pridham, Newark, N J.

I claim the plate, A, as constructed and used in combination with the bolt, E, provided with screws, G and F, as and for the purpose set forth.

70,896.—GRAIN DRILL.—Hiram Pulse, St. Paul, Ind.

I claim, 1st, The upper box or hopper, F, having the two doors, g g', and throats, H G', for optional discharge of the grain either through the screen or otherwise, as set forth.

2d, The slides, O and Q, adjusting lever, P, clamp, p, and slotted bar, p', combined and arranged substantially as and for the purposes set forth.

3d, The cross bolt, B, and nuts, 123456, in the described combination with the beams, A A', sheaths, C C' C'', and draft rod, Y, for the purpose specified.

4th, The slotted brackets, r, and slotted segmental arcs, r', in combination with the rear wheel, R, and driving belt or chain, S, as and for the purpose specified.

5th, The notched spouts, D, in combination with the valves, n, and winged shares, N n', for the purpose described.

6th, In the described combination with the screen, I, and screen chamber, F', of my grain drill, I claim the removable drawer, J, for the purpose specified.

7th, The notched rod, W w, and spring, f, for the purpose specified.

8th, The caster wheel, T, slotted bracket, U, and bolt, V, for supporting the front end of the implement in combination with the adjustable rear wheel, R, as and for the purpose set forth.

70,897.—DISCONNECTING HORSES FROM VEHICLES.—John Rancevas, Carthage, Ohio.

I claim, 1st, The socket, C, provided with the spring backing, e, in combination with the bolt, c, stay strap eye, d, and cords, l and G, arranged and constructed substantially as described and for the purpose specified.

2d, The pivoted hammer, f, guard, f'', revolving lever, F, spring double tree strap, E, and double tree, D, arranged as described upon the tongue or other desirable part of the vehicle, and operated substantially as described and for the purpose set forth.

70,898.—COMBINED HARROW AND SEEDER.—Benjamin Randall, Adams, N. Y.

I claim, 1st, The shaft, J, in the seed box, I, provided with the radial arms b, and rotated by means of suitable gears from one of the wheels, B, when the same is in combination with the scattering board or plate, M, and all arranged substantially as described and for the purpose set forth.

2d, The slide, K, perforated with the V-shaped holes, e, and fitting in the seed box, I, in combination with the perforated bottom, L, of the seed box which is perforated with circular holes, f, and the scattering board or plate M, the whole being constructed, arranged and operating substantially as and for the purpose specified.

3d, The combination of the harrow connected with the truck or mounted frame and the distributing apparatus applied to said frame, all arranged substantially in the manner as and for the purpose set forth.

70,899.—APPARATUS FOR TETHERING ANIMALS.—David W. Rawson, Croydon, N. H.

I claim the band, m, with the hook or hooks, b, and the flange, d, on the cap, c, to be applied to any tether in which a cap or socket turning on an upright stake or bar is used.

70,900.—TOBACCO PRESS.—Thomas N. Read, Danville, Va.

I claim, 1st, The shrouding box, A, provided with false sides, A A, substantially as and for the purpose described.

2d, The hinged cross head, C, when combined with the screw, B, as and for the purposes and operating in manner substantially as specified.

3d, The truncated conical body, G G, in combination with socket, f, toe, e, and band, H, substantially as and for the purposes above set forth and described.

70,901.—CARPENTERS' SQUARE.—C. H. P. Robinson (assignor to himself and John B Robinson) Bellport, N. Y.

I claim a carpenters' square provided with a slot, a, in the manner and for the purpose described.

70,902.—COMPOUND TOOL FOR CUTTING, PUNCHING, AND UPSETTING IRON.—John J. Rose, Elmwood, Ill.

I claim, 1st, The curved lever, F, pivoted in the frame, A, in combination with the slide, E, and lever, B, whereby the latter in its downward movement presses upon the inner end of the lever, F, whose outer end forces the slide inward to upset the iron held by the clamps, C D.

2d, The combination of the eccentric, L, upon the eccentric lever head, H, yoke, K, and slotted side piece, a1, with the plunger, J, and punch, I, as herein described, for the purpose specified.

3d, The construction and arrangement of the main lever, B, pivoted between side plates, a1 a2, at their rear ends, lever, F, slide, E, clamps, C D, and hand lever, H, with flange, k', as herein shown, for the purpose specified

70,903.—DOOR SPRING.—Cyrus W. Saladee, Newark, Ohio.

I claim the combination of the box, A, mandrel, C, spring, E, and plates D and K, with an arm, B, and stirrup, F, constructed and operating substantially as described, and for the purposes set forth.

70,904.—SCHOOL DESK AND SEAT.—J. P. Scott, Lewisburg, Pa.

I claim, 1st, The arrangement of the school desk, B, supported on the sliding standards, A A, and the seat, C, hinged to the slide pieces, b b, and supported by the segment arms, c c, constructed, combined, and operating, as and for the purposes herein described.

2d, The lid, f, hinged to the desk, B, in combination with the folding brackets, g g, in such manner as to fold on the top or close the hollow receptacle for books in the desk, arranged as herein set forth.

70,905.—APPARATUS FOR PUNCHING SHEET METAL.—Morris Seiferth, Morristown, N. J.

I claim, 1st, Securing the punch, C, in the bed plate, B, by means of the holder, G, and screw, e, and making it adjustable up and down by means the screw, b, substantially as herein shown and described.

2d, The application to the punching machine herein described of the auto-

matic lifter, i, by which the plate is raised off the punch, substantially as and for the purpose herein shown and described.

2d, The bar, h, lever, l, and spring, k, in combination with the cam, g, on the shaft, D, and with the stationary punch, C, all made and operating substantially as herein shown and described.

70,906.—SKATE.—G. W. Shearer, Crown Point Center, N. Y.

I claim the combination of the levers and springs between the blade and foot rest of a skate, when arranged and applied thereto, substantially as and for the purpose described.

70,907.—MAIL BAG.—Luther M. Sims, Lincoln, Ill.

I claim the case, C, constructed and used with the bag and its flap, a, substantially in the manner and for the purpose set forth.

70,908.—CARRIAGE JACK.—Joshiah B. Small, Boston, Mass.

I claim my improved carriage jack, as constructed with its notched lifter or slider, arranged with guide posts in manner as described, and as having two toggles and a forked lever, and a stop, h, thereof, arranged and combined together, and with one of the posts, in manner as specified.

70,909.—COOLING AIR AND OTHER SUBSTANCES.—Daniel E. Somes, Washington, D. C.

I claim, 1st, Atomizing liquids, by means of a fan-blower, substantially as described.

2d, Cooling air or liquids, substantially as set forth.

3d, The devices or their equivalents, substantially as set forth, for cooling air and liquids.

70,910.—ELASTIC PACKING FOR THE JOINTS OF DOORS, LIDS, AND THE LIKE.—Daniel E. Somes, Washington, D. C.

I claim, 1st, An elastic tube, having a flange, lug, or plate, or more than one of either, or their equivalents, substantially as herein described, and for the purpose set forth.

2d, An elastic tube, prepared by splitting, as in fig. 9, or by making holes, f, as in fig. 12, or in any equivalent manner, for the purpose set forth.

70,911.—CAR BRAKE.—Charles Spofford (assignor to Charles Spofford, Walter E. Hawes, Charles Hersey, and Francis C. Hersey), Boston, Mass.

I claim the eccentric-gear, M N, when used with mechanism for operating the brakes of railroad cars, etc., substantially as described.

I also claim the friction wheel, T, in combination with a slotted bar, w, and shipper, 7, for taking the power from the periphery of a car wheel, C, to wind up the brake, substantially as set forth.

70,912.—MACHINE FOR PRESSING BONNETS.—Solomon Squier, and Horace Squier, Monson, Mass.

We claim, 1st, The combination of the jointed presser, F f, pressure-bars, L, pressing-frame, A C D E, block, B, heater, b', suspension rod, G, lip plates' m n, and supplementary heaters, h h, as herein described, for the purpose specified.

2d, The block, B, when attached to the frame, A, by a slide hinge, b, so that different sized blocks may be used to press hoods of varying proportions, by the same machine, without changing the jointed presser, as herein set forth.

70,913.—FISH HOOK.—Elisha Sterling, Cleveland, Ohio.

I claim the combination with the hook, A B, sliding extension hook, a, and the counter extension hook, b, constructed substantially in the manner and for the purpose set forth.

70,914.—GOLD SEPARATOR.—William C. Stiles, Nevada City, Cal.

I claim, 1st, The arrangement of the openings, o o, protected by screens, s s, and ledges, l l, upon an inclined vibrating table, T, having a series of transverse ledges, l l, for the purpose of separating the gold dust from dirt, substantially in the manner described.

2d, The combination and arrangement of a series of foraminated water troughs, w w, with an inclined vibrating table, T, having openings, o o, and ledges, l l, substantially as and for the purpose set forth.

70,915.—VENTILATING DEVICE FOR BOOTS AND SHOES.—Amos Stocker, Watertown, N. Y.

I claim, 1st, The instrument seen in figs. 5 and 6, letter, C, in combination with a boot or shoe.

2d, I also claim the extra insole, with its spring or springs, in combination with the valve, as seen in fig. 6, letter, C, substantially as described, and for the purposes set forth in the specification.

70,916.—GRINDING MILL.—Giles M. Stone, St. Louis, Mo.

I claim the adjustable roller, B, operating in connection with the front edge of the chute, T, for the purpose of grinding the lumps which pass between the upper rollers before reaching the second rollers, as herein shown and described.

70,917.—MACHINE FOR FLANGING AND WIRING METALLIC PLATES.—Orson W. Stow, Plentyville, Conn.

I claim the combination, as well as the arrangement, of the adjusting screw bearing, L, with the rocker-shaft, K, and the roller-shaft, C, its shoulder, h, and clamp-nut, M, or their equivalents.

I also claim the combination and arrangement of the set nut, T, the rocker shaft, K, and the adjusting bearing, L, applied to the shaft and the case or frame of the machine, substantially as specified.

I also claim the application of the front box, of the shaft, C, to such shaft and the case or frame, I, so as to be capable of being moved in one arc with the shaft, and endwise with such shaft, as described.

I also claim the case or frame, I, as made and applied to the rocker shaft journals and the bearings of the two shafts, and so as to encase the gears, substantially as described and represented.

70,918.—HARVESTER.—A. W. Tucker, Waxahachie, Texas.

I claim suspending the finger bar and its appendages from a curved beam, D, pivoted to the rear of the frame of the machine, and adjustable in any desired position, as set forth, so as to set the finger bar at any desired hight, in combination with the pivoted extension, E', of the finger bar, and the chain and lever, h, all being constructed, arranged, and operated in the manner and for the purpose set forth.

70,919.—FAUCET.—John E. Tucker, Boston, Mass.

I claim a faucet, composed of pipe, B, with stem, C, and plug, D, with its grooves, c, pipes, G and A, and packing-ring, E, all constructed, arranged, and operating in the manner as and for the purposes set forth.

70,920.—MODE OF PREPARING CLOTH FOR RECEIVING LITHOGRAPHIC AND OTHER IMPRESSIONS.—Charles Volkmar, Jr., New York city, assignor to himself, Wm. P. Myers and Thomas Hedlem, Baltimore, Md.

I claim the process for preparing cloth for receiving lithographic, photographic, or other impressions, substantially as described.

70,921.—SELF-CLOSING HINGE.—Caspar Vetter (assignor to himself and Peter Schneider), Cincinnati, Ohio.

I claim, 1st, The combination, with a self-closing door, or shutter hinge, operating by gravitation and by a spring, substantially as shown, of the angular or non-circular top or head, B, and socket, K, permitting the door, when mounted, to gravitate to any desired position, as described.

2d, In combination with the spring, J, I claim the inclined edges upon collar, C, and socket, G, having depressions, g g', and prominences, c c', substantially as shown and described.

79,922.—GUIDES OR CLAMPS FOR HARNESS FRAMES.—Adolph S. Villee, Lancaster, Pa.

I claim the protecting guides, formed of strips, A B, with blocks or ends, C, arranged substantially as shown and described, for the purpose specified.

70,923.—SCREW DRIVERS.—T. D. Voorhees, Easton, Pa.

I claim the rotating thimble, C, with the flange, D, when applied to a screw driver, substantially as and for the purpose set forth.

70,924.—GRATE COMBINATION.—John Wallace, Louisville, Ky.

I claim the semi-circular tile, B, and grate, A, when the same are constructed and combined substantially as described and for the purpose set forth.

70,925.—PAPER RULING MACHINE.—Edmond A. Warren, Brooklyn, N. Y.

I claim, 1st, The rotating cylinder, C, provided with shafts, D D, having fingers, E, to grasp the sheets of paper to be ruled in connection with the pen-beam, O, provided with pens, Q, and all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The adjustable cams, N, at one end of the cylinder, C, in connection with the arm, M, on the shaft, J, provided with fingers, K K, for presenting the sheets to the cylinder, C, substantially as shown and described.

3d, The adjustable cams, T, at one end of the cylinder, C, in connection with the arm, S, on shaft, P, having the pen-beam, O, attached, substantially as and for the purpose specified.

4th, The cords, U U', arranged in relation with the cylinder, C, and working respectively over the rollers, Z Z' W Y Y' V, to operate substantially in the manner as and for the purpose set forth.

70,926.—WAGES INDICATOR.—Windsor N. White, Winchendon, Mass.

I claim the said wages indicator, or combination and arrangement of the cylinder, divided and marked substantially as described, with the slotted case or its equivalent, and the scale applied to such case, as set forth.

70,927.—CHIMNEYS.—A. S. Whittemore, Willimantic, Conn.

I claim the combination of a tile chimney, or flue, A, with an air pipe, C, the latter encompassing the former, and communicating with the external air and the compartments within the building, substantially as and for the purpose specified.

I further claim the elastic bands, B, fitted in the annular recesses, f, in the flanges at the ends of the tiles, substantially as and for the purpose set forth.

70,928.—AXLES AND AXLE BOXES.—David Wigger, New York city.

I claim, 1st, The rings, c d, fitted within the journal box, in combination with the collars, e, f, on the journal, Ax, substantially as and for the purpose specified.

2d, The arrangement of the packing ring, n, within the annular nut, C, and in relation with the journal, Ax, packing rings, h, and flange, g, substantially as and for the purpose specified.

70,929.—SELF-SETTING GAME TRAP.—Alfred Wilkin, McConnellsville, Ohio.

I claim, 1st, The combination of the shaft, B, operated by a spring or weight, arms, D, short lever, E, and lever, G, with each other, for the purpose of setting and tripping the trap, substantially as herein shown and described.

2d, The combination of the quadrant, I, and spear, K, with the arms, D, of the shaft, B, substantially as herein shown and described, for the purpose of killing the animal.

3d, The combination of the curved pivoted piece, L, connecting rods, N, elbow levers, O, and hinged platform, R, with each other and with the arms, D, of the shaft, B, substantially as herein shown and described, for the purpose of throwing the dead animal out of the way.

4th, The combination of the lever, T, and hooks, U and V, with the elbow levers, O, and quadrant, I, substantially as herein shown and described and for the purpose set forth.

70,930.—BELT FASTENER.—David Wigger, New York city.

I claim, 1st, The plates, B B', when firmly secured to the ends of the belt, and when shaped as described, so that they can only be disengaged by moving the ends of the belt aside, substantially as herein set forth.

2d, The plates, B and B', when made as set forth, in combination with the bolt, a, the same being made and operated substantially as and for the purpose herein shown and described.

70,931.—LANTERN.—Moses B. Wright, Meriden, Conn.

I claim the perforated metal cap, D, top, a, chimney, C, shell, B, and perforated metal band, d, all combined in the manner substantially as set forth.

70,932.—DICE BOX.—Justus E. Zender, New York city.

I claim, 1st, As a new article of manufacture, a hand dice box made of metal, substantially as and for the purpose described,

2d, I also claim a hand dice-box, lined with cloth, or any equivalent material therefor, whether such dice-box be made of metal or any other suitable material, substantially as and for the purpose specified.

REISSUES.

2,797.—MACHINE FOR BOLTING AND CLEANING CLOVER-SEED.—John C. Birdsell, South Bend, Ind.

I claim, 1st, The combination in a machine for threshing and hulling clover seed, of the bolts, A A', with the cranks, D E E, guide rods, F F, arms, G G H H, and connecting rods, B B', or their equivalents, in the manner and for the purpose set forth.

2d, I claim the combination, in the machine above described, for threshing and hulling clover seed, the trough, I, with the endless conveyer, J, in the manner and for the purposes specified.

2,798.—PITMAN CONNECTION FOR HARVESTERS.—Hiram L. Wanzer, New York city.

I claim, 1st, Connecting the pitman, B, to the pitman wheel, A, of a harvester, by means of a round or polygonal pin, a, having an eccentric projection, d, and made substantially as and for the purpose herein shown and described.

2d, The tapering pin, a, when arranged in combination with the pin, d, the washer, e, and nut, b, all made and operating substantially as and for the purpose herein shown and described.

3d, I claim the pin, i, in combination with the packing, k, all made and operating substantially as and for the purpose herein shown and described.

[NOTE.—FIFTY-ONE patents in the above list were obtained through the Home Office of the SCIENTIFIC AMERICAN.—EDS.]

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., 37 *Park Row, N. Y.*

66,372.—CLOTHES WRINGER.—C. H. Knox, Mount Pleasant, Iowa. Dated July 2, 1867. Application for reissue received and filed Oct. 21, 1867.

1st, I claim the double cog wheel, P, and double pinion, S, substantially as set forth.

2d, The combination of Cog wheel, P, and pinion, S, with rollers, D D, substantially as and for the purpose set forth.

3d, The arrangement and combination of lever, M, hinged to box, A, roller, L, rods, K, levers, I, and plate, G, arranged to operate upper roller, D, as set forth.

26,327.—NURSING BOTTLE.—Milo S. Burr (assignee by mesne assignments of Francis J. La Forme), Boston, Mass. Dated Nov. 29, 1859. Application for reissue received and filed Oct. 10, 1867.

I claim my said improved nursing bottle, having its body, A, composed of glass or other suitable material, and provided with an elastic nipple or mouth piece, f, and a flexible or pendulous tube, C, applied thereto substantially in manner and so as to operate as and for the purpose set forth.

I also claim in a nursing bottle otherwise properly organized, the use or employment of a flexible or pendulous tube, substantially as and for the purpose set forth.

I also claim the application of a gravitating tip or tube, c, to the lower end of the flexible tube, C, substantially as and for the purpose set forth.

68,398.—OVERSHOE.—Henry G. Tyer, Andover, Mass. Dated Sept. 3, 1867. Application for reissue received and filed Oct. 30, 1867.

I claim a boot or shoe constructed with an elastic gore or gores of vulcanizable material, when the said gore is inserted into the shoe before vulcanization and during the process of construction, and the whole completed by vulcanization substantially as set forth.

68,770.—CENTRIFUGAL MACHINE FOR DRAINING SUGAR AND OTHER SUBSTANCES.—David M. Weston, Boston, Mass. Dated April 9, 1867. Application for reissue received and filed Nov. 2, 1867.

1st, In the construction of centrifugal machines for separating liquids from other substances, I claim suspending such machines at the top by flexible connections operating substantially as described.

2d, The combination of the spindle, D, and its accessories, with the socket, R, and its india-rubber bushing, C, or other equivalent spring connection, to form a flexible and elastic bearing for the shaft, E, by which the cylinder may be suspended substantially as described.

3d, The employment in a centrifugal machine of a hollow shaft, and a spindle or axle on which it runs, to support the cylinder or basket, substantially as described.

4th, So forming and arranging the driving pulley, F, upon the shaft, E, that it shall surround the spring bearing, substantially in the manner and for the purpose described.

5th, The construction of the openings, I, in the bottom of the cylinder, in such machines and the valve, J, for the purpose of closing the same, substantially as described.

6th, The combination of the cylinder, G, the hollow shaft, E, the driving pulley, F, the spindle, D, its elastic bushing, C, and socket, B, to form the operative part of a centrifugal machine, substantially as described.

57,006.—GAS MAINS.—I. N. Stanley, Brooklyn, N. Y. Dated Aug. 7, 1866. Application for reissue received and filed Nov. 2, 1867.

I claim as an improvement in hydraulic mains for gas works, the combination with the main C, of the external supply tubes D, cast with or made separately from and attached to the main, and communicating with the same below the water or fluid therein, substantially as and for the purpose herein set forth.

34,088.—BASKET.—Lansing Marble and Townsend North, Vassar, Mich., assignees of Lansing Marble aforesaid. Dated Jan. 7, 1862. Application for reissue received and filed Nov. 2, 1867.

1st, I claim a basket formed of two series of overlapping splints, A A', substantially as described, and fastened in any suitable manner.

2d, Fastening hoops, a a D and C C, in combination substantially as and for the purpose described.

2,847, whole No. 33,851.—GANG PLOW.—Wm. B. Ready, Sacramento, Cal. Dated Dec. 3, 1861. Application for reissue received and filed Nov. 1867.

1st, I claim the curved beams, A, when used in connection with a gang plow, or a series of plows connected together by cross bars, B B B, constructed and operating as and for the purposes herein set forth.

2d, The arrangement of the arms, G, wheels, I, and lever, J, when attached to the right hand arms, G, and connected to the central beam, A, as and for the purposes set forth.

3d, The arrangement and application of the draft at any point or place below the top of the standard of the plow, as specified and described and for the purposes set forth.

56,189.—HORSE RAKE.—George Deal, Wilmot, Ohio. Dated July 10, 1866. Application for reissue received and filed Nov. 6, 1867.

I claim the combination and arrangement of the hinged arms, I I, adjusting screws, H H, or their equivalents, tooth roller, D, and rake teeth, L L, substantially as and for the purpose herein specified.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

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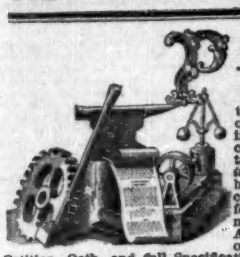

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